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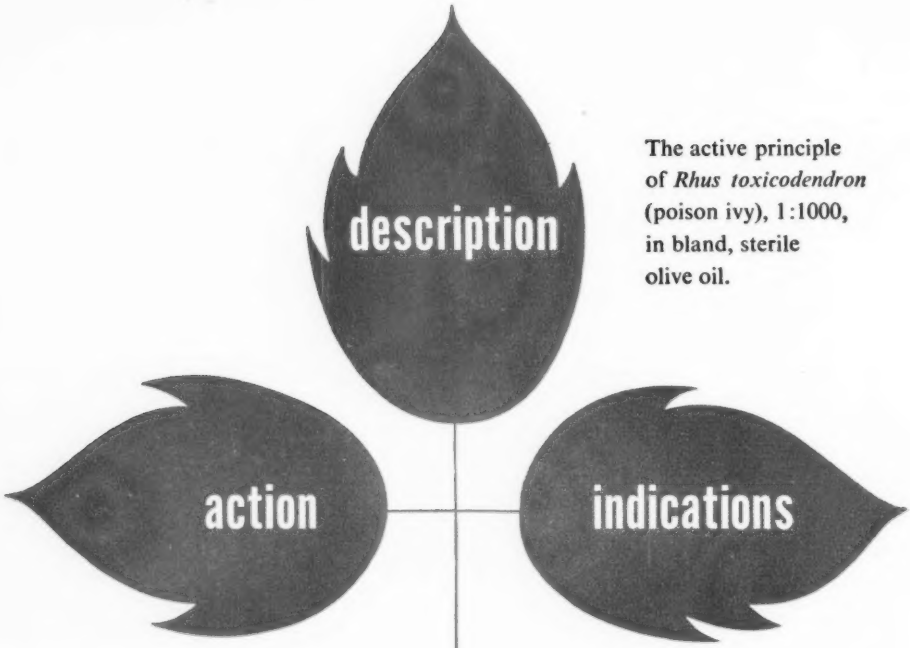

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Diagnosis and Treatment of Trichinosis

SYLVESTER E. GOULD*

WAYNE UNIVERSITY COLLEGE OF MEDICINE, DETROIT

HISTORICAL

In 1835, James Paget, then a 21-year-old first-year medical student at St. Bartholomew's Hospital in London, encountered, in the dissecting room, small whitish calcified specks in the skeletal muscles of a cadaver. He sought out someone who had a microscope, examined the specks and found them to be made up of cysts (Figure 1), each of which contained a worm. The worm was then named *Trichina spiralis* but is now known as *Trichinella spiralis*.

In 1846, a Philadelphia physician, Joseph Leidy, while eating a pork sandwich, noticed minute specks in the meat which struck him as being similar to those he had seen in the muscles of a human subject that he had dissected a few days previously. He examined the rest of the pork microscopically and found it to be full of trichinae (Figure 2). This discovery, for the first time, definitely associated the parasite with the pig.

It was not, however, until 1860 that the disease was known to produce fatal human infection. In that year, a German servant girl in Dresden, Germany, was brought into the hospital where she died thirty-three days after the onset of an illness which was diagnosed typhoid fever. Zenker, the pathologist, examined the skeletal muscles of this patient at autopsy for evidence of degeneration characteristic of typhoid fever, but found instead dozens of living worms in every microscopic field (Figure 3). This startling picture led him to undertake a remarkable bit of detective work. He visited the home of this girl and found that a pig had been butchered just before Christmas-time, that every member of the household had eaten of various products made from this pig, and that all persons subsequently became ill with a disease variously diagnosed. He found the same living worms in the unused meat. With the aid of Virchow and other investigators, he then conducted experiments to work out the life cycle of the parasite (Figure 4).

When pork, containing living trichinae, is eaten by man, or when the scraps of pork (in garbage) are eaten by the pig, the muscle and the cyst walls are digested in the stomach of the host, liberating the larvae. These larvae, which are of male or female sex, mature in the small intestine of the host, and toward the end of the first week copulate. The adult male later dies but the adult female, burrowed in the mucosa of the small intestine, during the next eight weeks or so, liberates her living young worms into the mucosal lymphatic vessels from where they reach the heart, then the general blood stream, and finally are filtered out of the blood capillaries to settle and encyst in the skeletal muscles of the host (Figures 5-11).

Shortly after the discovery of this first fatal infection in 1860, several epidemics (Table I) occurred in Germany, the most notable of which

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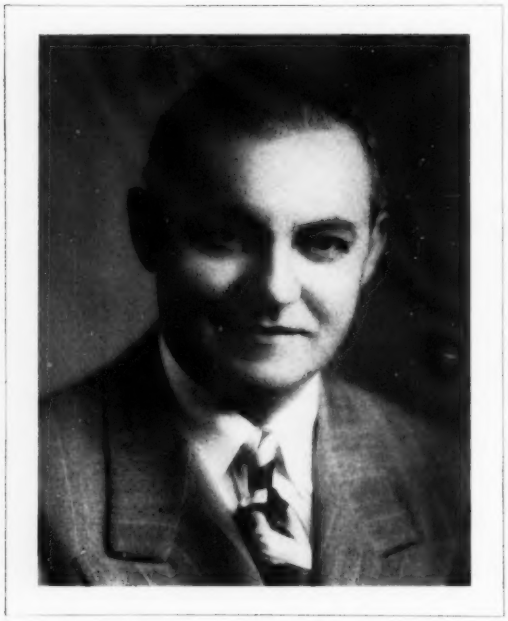

SYLVESTER E. GOULD

took place in 1865 in the town of Hedersleben, having a population of 2,100. There 327 persons fell ill, and 101 died from this disease, a mortality of 30 per cent. This stirred the medical profession in Germany to urge the adoption of measures for control of the disease. The net result was that a system of microscopic inspection of all hogs slaughtered in Germany was instituted, for which Virchow, who was also a leader of the Reichstag, was primarily responsible.

AUTOPSY SURVEYS

Within recent years in the United States a number of surveys of the incidence of trichinosis in autopsies have been made, and these show an average of 16 per cent infection (Table 2). This means that at least 16 per cent of persons in the United States, at the time of death, have trichinosis. In our series of over 1,200 autopsies, we found a total incidence of trichinous infection of 22 per cent (Table 3). Notice in Table 3 that in succeeding decades the incidence became progressively greater, so that in the 80's we found an incidence of 33 per cent. It stands to reason that the older the person, the more chances he has had of exposure to this infection.

At autopsy larvae may be sought by the usual microscopic method of sectioning, and by the compression (Figure 12) and digestion methods. In our series we found 2 per cent of infections when a single block of diaphragmatic muscle was sectioned. By compression of a 1.0 gm. portion of diaphragm we detected 11 per cent, but when 10 portions of 1.0 gm. each were examined we detected 29 per cent of infections. By the digestion method alone we found 16 per cent. When both methods were used we were able to recover trichinae from over 30 per cent of bodies examined. In large part, therefore, the incidence of infection as determined at autopsy will depend upon the methods used and the thoroughness with which these methods are applied.

The muscle taken from the patient or from the subject at autopsy may be examined under the microscope for presence of the organism. In the digestion method, artificial gastric juice (1 per cent pepsin and 1 per cent hydrochloric acid) is added to the ground muscle in a container. The mixture is stored in an incubator-room overnight to digest the muscle and the cyst walls. The larvae, however, resist digestion. When the mixture is then filtered, the organisms (Figures 13 and 14) are recovered (Table 4).

Figure 1. Portion of diaphragm, from a man of 59, showing calcified trichina cysts.

Figure 2. Trichina larvae in muscle, seven months after infection. X45. Unstained preparation mounted in glycerin.

Figure 3. Trichina larvae in muscle, seven months after infection. X25. Unstained preparation mounted in glycerin.

DIAGNOSTIC METHODS

Methods that may be used for diagnosis of the disease include examination of the blood for eosinophilia, immunologic tests (intradermal test, blood precipitin test, and complement-fixation test); demonstration of larvae in the host, in the blood, in the cerebrospinal fluid, in skeletal muscles, and demonstration of larvae in the suspected meat (Table 5).

The leukocyte count is generally increased in the disease, with eosinophilia as the most important single sign (Figure 15). Many times eosinophilia is present in persons who have eaten lightly infected meat, even though they develop no symptoms. This finding is encountered frequently in epidemics, in which the symptoms of various patients may be severe, moderate, mild, or absent.

The eosinophilia appears earliest at about the tenth day after eating the infected meat and increases to a peak in the third week. The severity of the disease is not paralleled by the severity of the eosinophilia. In other words, the degree of eosinophilia is not an index to the severity of the disease. In the presence of a complication the level of eosinophilia often falls; when the complication disappears, the eosinophilia often returns. A sudden, rapid drop in number of eosinophils to one or zero is usually a grave prognostic sign, many times foreboding death of the patient a day or two later.

The duration of eosinophilia is usually several months. After six months, ordinarily, the eosinophilia has disappeared.

For the intradermal test, the material used is made from an extract of the ground larvae. The reaction first appears on the sixteenth day of infection (Figure 16). Blood precipitin and complement-fixation tests become positive on or after the thirtieth day.

SYMPTOMS

The incubation period of the disease varies from two to twenty-eight days, and averages ten days.

The stages of the disease are conveniently divided into the intestinal stage, the stage of muscular invasion, and the stage of convalescence.

The common symptoms of the disease are:

1. Intestinal: constipation or diarrhea, either of which may be severe and protracted.
2. Fever: important, for this is one of the few

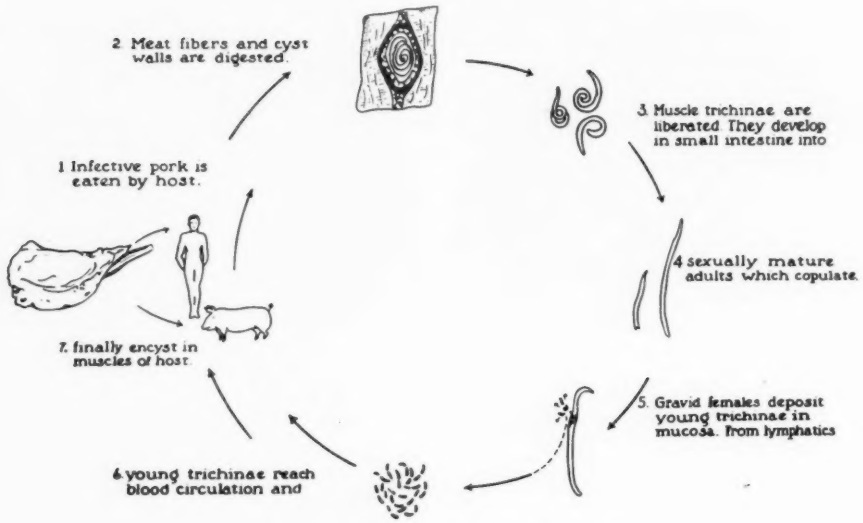
2. Meat fibers and cyst walls are digested.
3. Muscle trichinae are liberated. They develop in small intestine into
1. Infective pork is eaten by host.
4. sexually mature adults which copulate.
7. finally encyst in muscles of host.
5. Gravid females deposit young trichinae in mucosa. from lymphatics
6. young trichinae reach blood circulation and

Figure 4. Life cycle of *Trichinella spiralis*.

parasitic diseases accompanied frequently by fever (Figure 17).

3. Ocular: early and important (Figures 18 and 19).

4. Muscular: giving rise to the most severe and distressing symptoms of the disease, pain. Of course, there is the positive biopsy; here the organism is seen to be encysted in the muscle, which is the seat of an intense inflammation (Figure 20).

5. Respiratory symptoms.

6. Neurologic symptoms; cutaneous symptoms. There may be an encephalitis with associated petechial hemorrhages (Figure 21), and sometimes the patient complains of very severe headaches, saying that the top of the head seems as if it were about to come off.

Splinter hemorrhages under the nails (Figure 22) are not infrequent. Hemorrhages may occur in any organ. I believe that small hemorrhages are usually produced by plugging of the capillaries.

7. The cardiovascular symptoms are perhaps the most important, in that most deaths are related to cardiovascular involvement.

Myocardial involvement is constant (Figure 23). The organisms invade the myocardium but, for some unknown reason the organisms are unable to encyst in the heart. However, they do set up a severe inflammation. Myocarditis is frequently the cause

Figure 5. Adult male trichinae (stage found in small intestinal tract of host early in infection). X65.

Figure 6. Adult female trichina containing numerous larvae within its uterus. X65.

Figure 7. Portion of gravid adult female trichina imbedded in mucosa of duodenum of experimental white rat, six days after infection. X55.

Figure 8. Portion of adult worm shown in Figure 7. X250. Note larva present within vagina of mother worm, from which it will soon be extruded into tissues (intestinal mucosa) of host.

Figure 9. Muscle trichina. X135. From white rat, six days after experimental infection.

Figure 10. Beginning coiling of trichina larvae in muscle of white rat, eighteen days after experimental infection. X35.

Figure 11. Myositis in human trichinosis four weeks after infection. Note degeneration of muscle, edema and inflammatory cell infiltration. X70.

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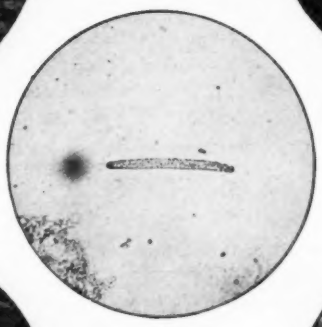

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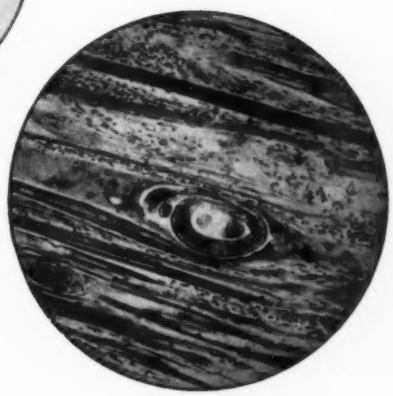

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TABLE 1

EARLY EPIDEMICS OF TRICHINOSIS IN GERMANY

Year	Town	Persons Ill	Deaths	Mortality Rate, Per Cent
1849	Wegeleben	164	27	16.5
1863	Hettstädt, pop. 4,000	158	27	17.1
1865	Hedersleben, pop. 2,100	337	101	30.0
1883	Emersleben	403	66	16.4

TABLE 2

INCIDENCE OF TRICHINOSIS IN THE UNITED STATES AT AUTOPSY

Year	Author	Locality	Method	Number of Examinations	Positive	
					Number	Per Cent
1931	Queen	Rochester, N. Y.	Digestion	344	59	17.1
		Boston, Mass.	Digestion	58	16	27.6
1934	Riley and Scheifley	Minneapolis, Minn.	Compression	117	20	17.1
1936	Hinman	New Orleans, La.	Digestion	200	7	3.5
1936	McNaught and Anderson	San Francisco, Calif.	Digestion	200	48	24.0
1937	Magath	Rochester, Minn.	Compression	220	17	7.7
1937	Pote	St. Louis, Mo.	Compression and microscopic section	1,060	163	15.4
1937	Queen (reported by Scheifley, 1938)	Denver, Colo.	Digestion	431	70	16.2
1938	Scheifley	Minneapolis and St. Paul, Minn.	Compression	118	15	12.7
1938	Evans	Cleveland, Ohio	Digestion and compression	100	36	36.0
1938	Walker and Breckenridge	Birmingham and Tuscaloosa, Ala.	Digestion and compression	100	33	33.0
1939	Butt and Lapeyre	Los Angeles, Calif.	Digestion	170	31	18.2
1939	Harrell and Johnston	Durham, N. C.	Digestion	44	0	0.0
			Compression	6	0	0.0
			Digestion and compression	55	3	5.4
1939	Hood and Olson	Chicago, Ill.	Digestion	208	12	5.8
			Digestion and compression	220	25	11.4
1939	Sawitz	New Orleans, La.	Digestion and compression	400	24	6.0
1940	Catron	Ann Arbor, Mich.	Digestion and 270 compression	300	44	14.7
1940	Oosting	Dayton, Ohio	Digestion and (1/3) compression	134	27	20.1
1941	Meleney	Nashville, Tenn.	Digestion and compression	209	21	10.0
1942	Wright	Various cities in 37 states	Digestion and compression	5,362	853	15.9
1942	Gould	Eloise, Mich.	Digestion	90	11	12.2
			Digestion and compression	1,141	266	23.3
	Totals 1931 to 1942			11,287	1,801	16.0

of death. For that reason the patient in any moderately severe or severe infection should be put to bed to safeguard the heart until all danger of myocardial failure is past. This period should extend to two or three weeks after disappearance of general myositic pain.

The electrocardiograms in Figure 24 are from a supervising nurse who was at home quite ill with the disease for four weeks before she came to our attention. She insisted she was not sick enough to go to bed, but we put her to bed at once, despite her protest. We not only put her to bed but put her at absolute rest. At this time she had but few mild residual muscular and cutaneous symptoms. Ten days after she was confined to bed she developed precordial distress with a smothering sensation and palpitation, and the electrocardiogram showed evidence of myocarditis. Ten days later these symptoms had disappeared, and two weeks thereafter she was permitted out of bed. She then made a rapid convalescence.

The literature contains many reports of patients with moderately severe infections who have left their bed after beginning of subsidence of the acute muscular symptoms only to develop fatal acute myocardial failure a week or two later.

TABLE 3

INCIDENCE OF TRICHINOSIS ACCORDING TO AGE AT AUTOPSY (1,231 autopsies)

Age (In Years)	Persons Examined	Persons With Trichinosis	Per Cent With Trichinosis
All ages	1,231	278	22.6
Under 10	2	0	0
10-19	6	0	0
20-29	28	1	3.6
30-39	84	10	11.9
40-49	188	32	17.0
50-59	293	72	24.6
60-69	335	78	23.3
70-79	219	61	27.9
80-89	70	23	32.9
90-99	4	1	25.0
Unknown	2	0	0

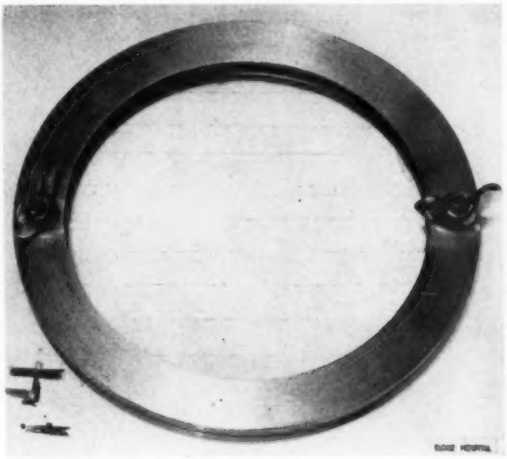

Figure 12. Compressor for microscopic examination of muscle. This consists of two pieces of plate glass which are held in a metal frame. The muscle is placed between the glass plates and compression is applied by means of thumb screws. X ½.

TREATMENT

The only treatment is symptomatic with bed rest until the danger of heart failure or of complications has passed. There is no specific remedy for trichinosis. What then may we do to control this disease?

EXTENT OF INFECTION IN U.S.

First, I should like to say another word about the extent of the infection in the population of the United States. In order to understand that, we must realize that the disease, transmitted to man from the hog, is quite prevalent among hogs in the United States.

The incidence in hogs depends upon the type of feeding given them. Among hogs that are fed slaughter-house offal, 15 per cent of animals will develop trichinosis. Among hogs fed uncooked garbage, 6 per cent will show this infection. But if hogs are fed grain or cooked garbage, less than 1 per cent will develop trichinosis. I believe that most of these infections are caused by occasional pork scraps that get into their food. I believe the factor of spread of the infection from rats to pigs is of little or no significance.

Compared to many other countries, we see that the incidence of trichinosis among hogs in the United States is remarkably high (Table 6). Approximately 1.5 per cent of 8,000,000 hogs examined in this country between 1898 and 1906 were found to have this disease. It is remarkable that in 1948, the average incidence of trichinosis among hogs in this country is still 1.5 per cent! Why? you may ask. Because, during all these years, practically nothing has been done to control this disease.

THE following little problem in arithmetic indicates the possible danger from eating pork in the United States: In 1944, nearly 100,000,000 hogs were slaughtered. These animals produced nearly 13,000,000,000 pounds of pork, and it is estimated that this furnished approximately 30,000,000,000 servings of pork. For a population of 150,000,000 people this would mean approximately 200 servings per person per year. Since 1.5 per cent of all hogs in the United States are trichinous, 1.5 per cent of 200 servings would mean three servings of trichinous pork, on the average, per person per year. Since the average length of life in the United States is 66 years, 66 times 3 means that 200 servings of trichinous pork will be offered, on the average, to each person in the United States during his lifetime. Fortunately, most of these servings will contain dead trichinae because the meat has been properly prepared. But remember this: *Only one meal with living trichinae is required to produce the infection, and one seldom knows which meal that may be.*

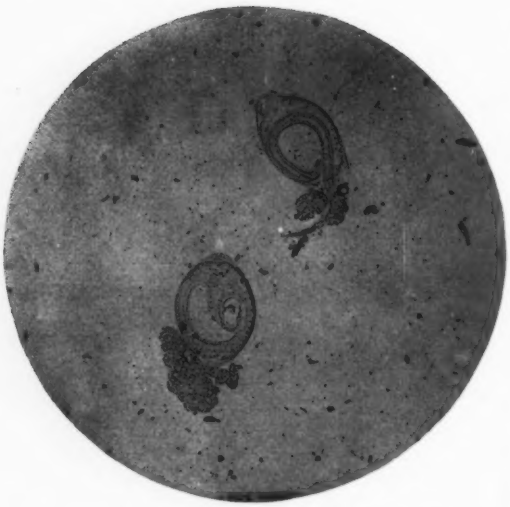

Figure 13. Trichina cysts taken from digested human diaphragm. X 35.

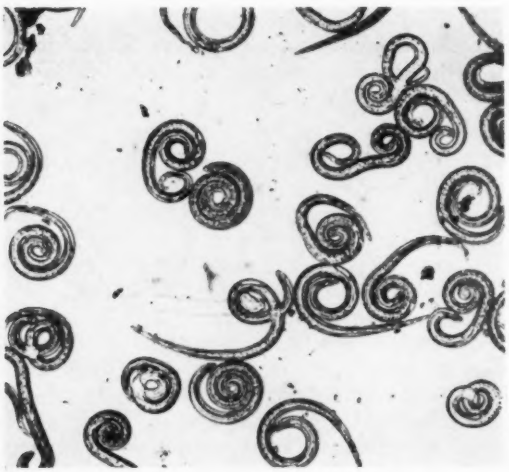

Figure 14. Trichina cysts obtained from digested human diaphragm. X 35.

I believe it is a fair estimate, that 25 per cent of all persons become infected during their lifetime in the United States. In this city of Cleveland, in examinations made in a series of 100 autopsies ten years ago, the incidence of trichinous infection was found to be 36 per cent! I believe that approximately 5 per cent of persons who are infected become ill, and that 1 per cent are confined to bed.

Most infections are not diagnosed. When an infection occurs sporadically, it is usually misdiagnosed. Ordinarily, it is only in the presence of an epidemic or an endemic of the disease or when the patient is sick enough to go to the hospital, thus permitting a complete examination including a differential blood count, that the diagnosis is made. At other times the physician must be aware of the disease or must have had previous experience with the disease in order for him to suspect it. But the vast majority of clinical infections are not recognized.

The severity of the illness depends upon the number of living larvae ingested. Since in any given batch of infected meat there are approximately twice as many female larvae as male larvae, and since each ingested female larva, upon developing to maturity, gives birth to approximately 1,500 new larvae, the number of larvae developing in the muscles of the host (man) will be equal to approximately 1,000 times the number of living larvae which he ingests in the meat.

The mortality in the United States for some years has been between 5 and 6 per cent of clinically diagnosed cases.

MEDICO-LEGAL ASPECTS

There are a number of legal suits each year, most of which allege violation of the implied warranty to the public by the manufacturer or packer that the food (pork) produced by him is fit for human consumption. It is not uncommon for a producer to settle one or more cases each year rather than advocate or institute the control measures which would prevent the spread of the disease.

I would like to point out that sausage containing pork is one of the principal foods responsible for this infection. It is not so important that the sausage be "nice and brown" merely on the outside; it is much more important that it be well done on the inside.

POSSIBLE METHODS OF CONTROL

There are three possible methods of control, in addition to cooking.

1. Microscopic inspection of pork. This method

TABLE 4

RECOVERY OF T. SPIRALIS AT AUTOPSY

Method of Examination	Muscle Examined	Gm. of Muscle	Number of Autopsies	Per Cent Positive
1. Microscopic section	diaphragm	0.25	331	2.4
2. Compressor	pectoral$_g$	1	1,004	11.1
	diaphragm$_g$	1	1,139	13.5
	diaphragm$_t$	1	1,031	19.7
	diaphragm$_t$	10 x 1	317	29.3
3. Digestion	pectoral$_g$	48	1,102	16.1
	diaphragm$_g$	47	1,231	16.4

$_g$ = ground muscle; $_t$ = tendinous portion.

TABLE 5

DIAGNOSTIC TESTS IN TRICHINOSIS

A. Eosinophilia in blood
B. Immunologic tests
   1. Intradermal
   2. Blood precipitin
   3. Complement-fixation
C. Demonstration of larvae
   1. In the host
      a. blood
      b. cerebrospinal fluid
      c. skeletal muscle
   2. In suspected meat

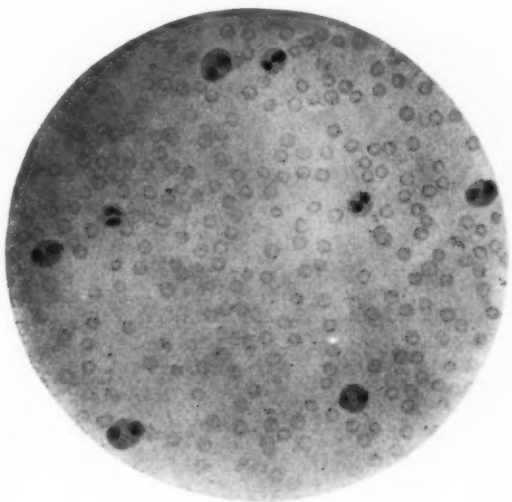

Figure 15. Eosinophilic polymorphonuclear cells from blood of a patient with trichinosis. X 320.

is used in Germany and a number of countries in Europe and in South America. For the United States, this method is believed to be quite impractical, since it would require an army of hundreds of thousands of inspectors.

2. Control of garbage feeding of hogs. This method is in use in England, Canada, and in several states in the United States, including New York, Kentucky, and Oregon. The method can be enforced as far as large producers of pork are concerned, but it simply cannot be enforced as far as the average farmer is concerned.

These two methods, therefore, are not practical. The only other method concerns processing or refrigeration, and in part this method is in operation in federally inspected meat packing plants.

3. Freezing. For cuts not over 6 inches thick, 5° F. for at least twenty days. This is a method which you may use at home if you have a "deep freeze" cabinet in which the temperature usually varies between 5° and 0° F. Keep the cuts of pork (not over 6 inches thick) for at least three weeks at this temperature, and you may be sure that the organisms will be nonviable after that time.

The following temperatures on the outside of containers, for cuts of pork not over 6 inches thick, are required by the Department of Agriculture in federally inspected plants: 5° F. for twenty days; −10° F. for ten days, or −20° F. for six days. We have found the following temperatures at the center of the meat will render all trichinae nonviable: −17° F. for thirty-six hours; −22° F. for twenty-four hours; −31° F. for forty minutes; −36° F. for two minutes.

4. Cooking. All portions of the meat should be white; there should be no pink. Boiling should be continued at least thirty to thirty-six minutes per kilogram (2.2 pounds). For thick cuts, the approximate guide is one-half hour per pound.

Figure 16. Immediate intradermal reaction (left), showing appearance of wheal within fifteen minutes after intradermal injection of 0.1 cc. of a 1:10,000 dilution of trichina antigen. Control test (negative) on right.

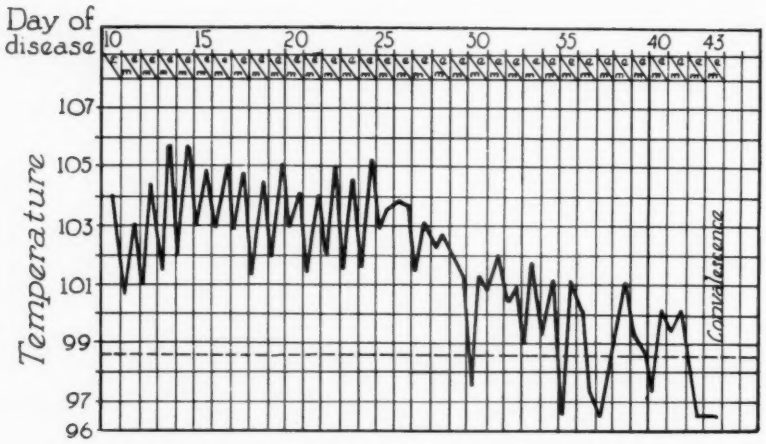

Figure 17. Fever chart in severe clinical trichinosis. (After Glazier.)

The minimum recommended temperature for killing trichinae is 137° F. This is the temperature which the Government requires in federally inspected plants for processing of pork products.

The situation in the United States at the present time concerning treatment of pork for the control of trichinosis is very much like the status of pasteurization of milk thirty or forty years ago. We might ask now, "Shall milk be pasteurized?" Well, we take it for granted that we must have pasteurized milk in our cities. But we have no similar protection from the danger of trichinosis in the eating of pork.

We might similarly ask, "Shall pork be process-

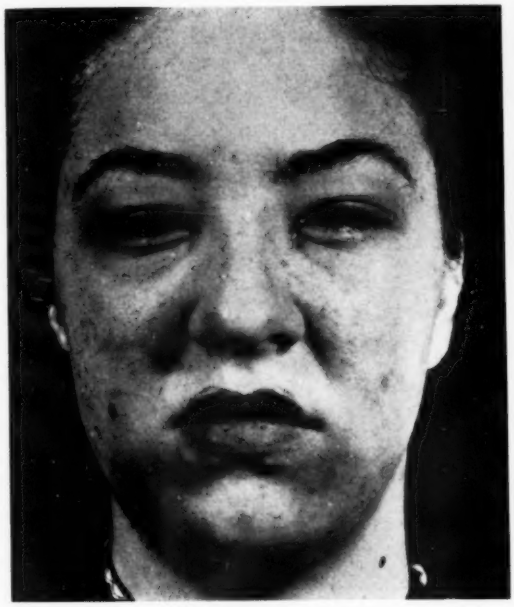

Figure 18. Characteristic edema of upper eyelids and face in acute trichinosis. (Courtesy of Dr. J. B. McNaught.)

Figure 19. Conjunctival hemorrhage in acute trichinosis.

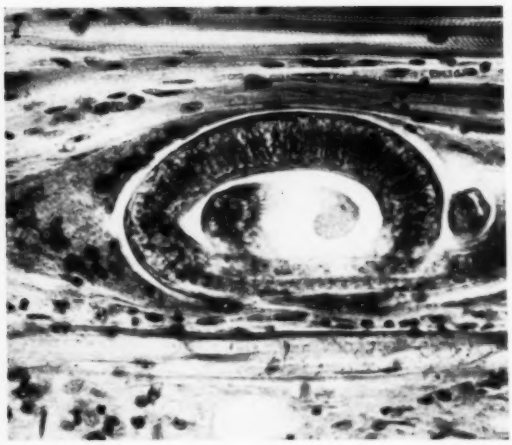

Figure 20. Encysting trichina larva in human skeletal muscle, four weeks after infection. X 300.

ed?" Of course it should be processed. But virtually nothing is being done about processing pork at the present time. Pork should carry a label indicating it is free from the danger of trichinosis in the same way that pasteurized milk carries a label, in order that the consumer may know that it is a safe food.

RECOMMENDED REGULATIONS

It is recommended that the Government (or state or local authority) require that all pork intended for sale shall be so processed as to render it free from viable trichinae. It is recommended that all pork products shall then bear the label, "This product conforms to United States (or state or local) regulations for pork."

It must be obvious that this disease, being so widespread, constitutes a major health problem in the United States and that, except for those instances in which pork products are produced under federal inspection, nothing is now being done about it. Even though the consumer is aware of the danger of trichinosis, often he cannot tell if the pork or pork product which he eats has been properly prepared. Is it not shocking then to realize that the American consumer usually has no guarantee that the pork that he eats does not con-

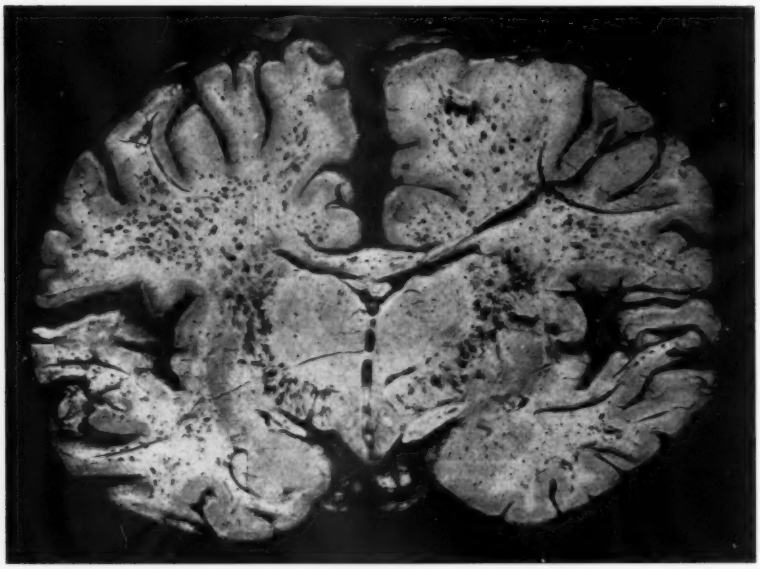

Figure 21. Trichinous encephalitis. Death seventeen days after onset of symptoms. (Courtesy of Dr. K. L. Scharenberg.)

Figure 22. "Splinter" hemorrhages beneath nails of patient with trichinosis. (Courtesy of Dr. J. B. McNaught.)

Figure 23. Trichinous myocarditis from human infection. X 185.

Acknowledgment. Figures 1, 3, 4, 7, 8, 10, 11, 13, 17, 18, and 21-24 are reproduced from S. E. Gould's "Trichinosis." Courtesy of Charles C Thomas, publisher, Springfield, Ill.

tain living trichinae? Is it not shocking that the average American, in eating pork, often unknowingly does so at the risk of becoming seriously ill or of dying from trichinosis? And is it not high time that something *was* being done about it?

I believe that all pork, unless otherwise processed, should be subjected to low temperature treatment as a practical means of rendering all trichinae that may be present within it nonviable. In this way, pork may be made a food that *is* fit for human consumption.

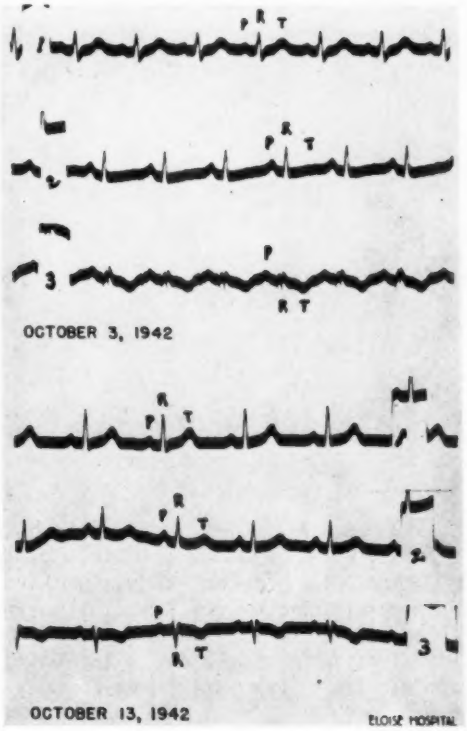

Figure 24. Upper electrocardiogram taken twenty-six days after infection showing flat T waves in lead II. Lower tracing taken ten days later, shows return of these T waves to upright position.

TABLE 6

TRICHINOSIS AMONG HOGS

Place	Year	Hogs Examined	Percentage of Hogs Trichinous	Number of Trichinous Hogs Per Million
New Zealand	1937	20,000	0	0
Copenhagen	1910-1935	6,000,000	0.00075	7
Prussia	1932	14,000,000	0.001	9
Prussia	1933	14,000,000	0.0008	8
Heidelberg	1934-1939	100,000	0.001	10
Poland	1935	3,600,000	0.05	500
Canada	1940	2,995	0.57	5,700
United States	1898-1906	8,000,000	1.41	14,100

REFERENCE

1. GOULD, S. E.: Trichinosis. Springfield, Ill., Charles C Thomas, 1945, 356 pp.

Selection of Cases for Lempert Fenestra Nov-Ovalis Operation

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NEW YORK

Otosclerosis is a pathologic lesion within the bony labyrinthine capsule of the temporal bone. It has been observed histologically in oval window, round window, cochlear promontory, and internal auditory meatus.

Clinical otosclerosis is the clinical picture of deafness which leads one to suspect the presence of stapedial foot-plate fixation due to otosclerosis within the region of the oval window. The diagnosis of clinical otosclerosis is not difficult.

In performing the fenestra nov-ovalis operation, stapedial foot-plate ankylosis has been observed in almost 100 per cent of cases diagnosed preoperatively as clinical otosclerosis.

In the only 2 cases that later came to autopsy of irrelevant causes the otosclerotic lesion was histologically present in the region of the oval window. Histologic changes indicative of otosclerosis have been observed in some of the ossicles removed during the performance of the fenestra nov-ovalis operation.

DIAGNOSIS OF CLINICAL OTOSCLEROSIS

The diagnosis of clinical otosclerosis in a deafened patient may be reached preoperatively when:

1. A family history of hereditary deafness is obtainable.

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Presented November 9, 1948, before the meeting of the Interstate Postgraduate Medical Association of North America, Cleveland, Ohio.

2. The loss of hearing for airborne sound is progressive in degree and extent. It begins in the lower tone frequencies first and ultimately involves the higher frequencies.

3. The loss of hearing which as a rule begins in one ear first, is almost always bilateral.

4. The hearing for bone-conducted sound when tested with steel tuning forks is prolonged over and above the hearing for airborne sound in those frequencies where the hearing by air conduction is impaired.

5. The hearing for normal conversation is better in noisy than in quiet places.

6. Weber test: Bone-conducted sound as tested with the 512 frequency steel tuning fork is lateralized to the worse of the two ears when there is a marked difference in hearing by air conduction in the two ears, provided the hearing by bone conduction in the worse ear is greater than in the less deafened ear.

7. The tympanic membranes appear normal.

8. A carefully taken history definitely established the fact that the hearing loss did not begin following a middle ear infection.

The Lempert fenestra nov-ovalis operation, which consists in creating a new oval window in the surgical dome of the vestibule to replace Nature's oval window which has become functionally impeded as a result of otosclerosis, can result in the restoration of practical, serviceable, unaided hearing in carefully selected cases of clinical otosclerosis.

When the hearing for airborne sound in an otosclerotic ear has audiometrically receded to the 40 decibel level or lower in the 512-1024 and 2048 pure tone frequencies, which frequencies are the most important for the intelligibility of the spoken voice, air conduction hearing ceases to be useful for social and economic contacts. Under such circumstances the performance of the fenestra nov-ovalis operation may be considered.

However, the conclusion that the performance of the fenestra nov-ovalis operation can result in the restoration of practical serviceable and unaided hearing in an ear deafened as a result of otosclerosis may be reached only in the presence of obtainable evidence suggesting that there still exists in that ear a sufficient amount of cochlear nerve function not being utilized by the functionally impeded air conduction mechanism, which can permit such an improvement in hearing for airborne sound following creation of a new oval window.

The cochlear nerve function reservoir in an ear deafened as a result of stapedial ankylosis due to otosclerosis may be considered adequate enough for the restoration of practical serviceable and unaided hearing with the fenestration operation when (1) the preoperative bone conduction hearing for the 512-1024 and 2048 pure tone frequencies, when tested audiometrically with care and understanding, is found to be not lower than the 30 decibel level, and the decibel level of the bone conduction hearing is at least 25 to 30 decibels higher than the decibel level of the air conduction hearing; and (2) the intelligibility for the normally spoken voice and whisper is improved to the practical level with the aid of either the old-fashioned speaking tube or the ear trumpet.

JULIUS LEMPERT

The correct determination preoperatively of the cochlear nerve function reservoir remaining untapped by the functionally impaired air conduction mechanism is not difficult if the otologist possesses a good old-fashioned clinical sense plus an appreciation of the psychology of the deafened. By supplementing the audiometric testing with intelligent use of the old-fashioned 512-1024 and 2048 frequency steel tuning forks for testing bone conduction hearing for pure tones, plus the use of the outmoded speaking tube for testing the intelligibility for the spoken voice, the otologist can obtain much more valuable information as to the possibility of restoring practical hearing with the fenestration operation in a given ear than by accepting the reports of conclusions reached by physicists and acoustic engineers with the use of extremely complicated apparatus in their psychoacoustic laboratories.

No otologist should perform a fenestration operation without first personally testing the patient to determine his chances for the restoration of practical hearing. He must never operate solely on the findings of another otologist.

Unless the otologist is conscious of the existing burning desire within a deafened person to have his hearing function restored and the psychology behind his readiness to submit to any form of treatment, no matter how great the risk or remote the prospect of relief may be as a result of such treatment, he can readily be misled to diagnose a nonsuitable case as a suitable one for the fenestration operation. The fenestration operation is as a rule the patients' last hope of regaining their hearing, since they always try everything less radical first.

Many such patients come ready to induce the otologist to operate. They know that good bone conduction hearing is a prerequisite to such surgery. They often come psychologically prepared to

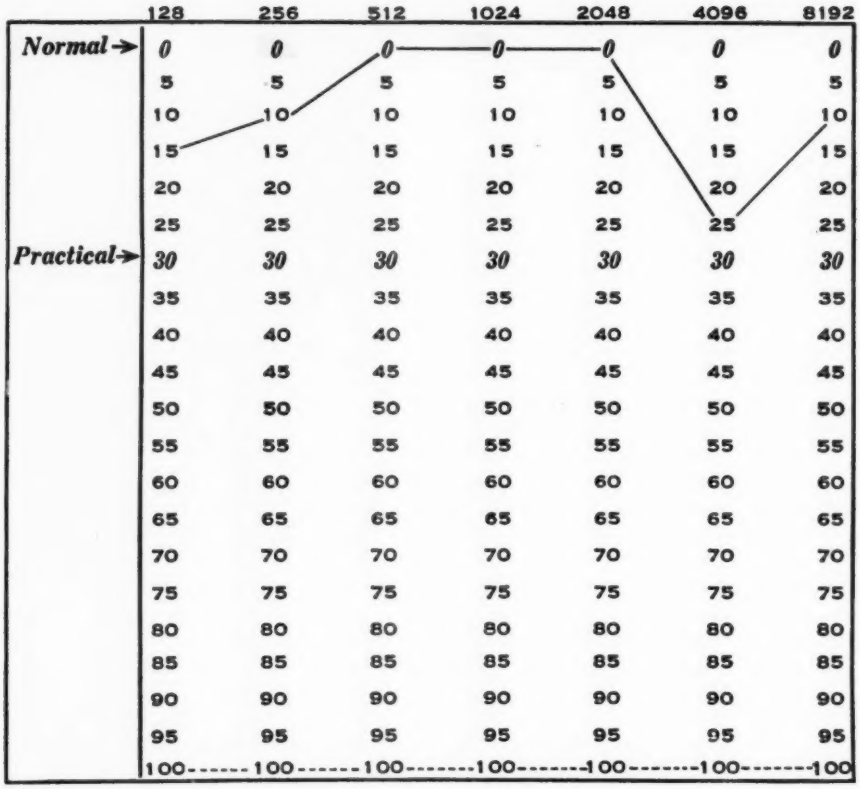

Figure 1*a*. Despite a preoperative total loss of air-conduction hearing, the presence of an unusually adequate cochlear nerve function reservoir permitted the restoration of hearing with the Lempert fenestra nov-ovalis operation to the audiometric level of normalcy. The hearing has been continuously maintained at this high level for the past six years.

convince the surgeon, who is testing their hearing with the old reliable steel tuning forks, that their bone conduction hearing is much better than their hearing for air conduction. Unless the otologist is on the alert and understands this psychology and tries to compare their voluntary with their involuntary response to sound, he will often be misled to operate with no chance of improving the hearing since the cochlear nerve function reservoir was erroneously estimated as being adequate enough to permit the restoration of hearing.

Experience has shown that an improvement in hearing for air-conducted sound following fenestration must reach at least the 30 decibel level in the 512-1024 and 2048 frequencies to be considered as serviceable enough for social and economic purposes and obviating the necessity of wearing a hearing aid.

Hearing can be restored to the practical level or higher, even as high as the normal level by the fenestration operation, providing the reservoir of unused cochlear nerve function still present at the time of operation is sufficient to permit such restoration of hearing. In the presence of an adequate cochlear nerve function reservoir the degree of the preoperative hearing loss for airborne sound, no matter how great, will nevertheless not interfere with restoration of practical hearing. (Figure 1*a*.)

Having correctly diagnosed the possibility of obtaining practical hearing and having obtained it

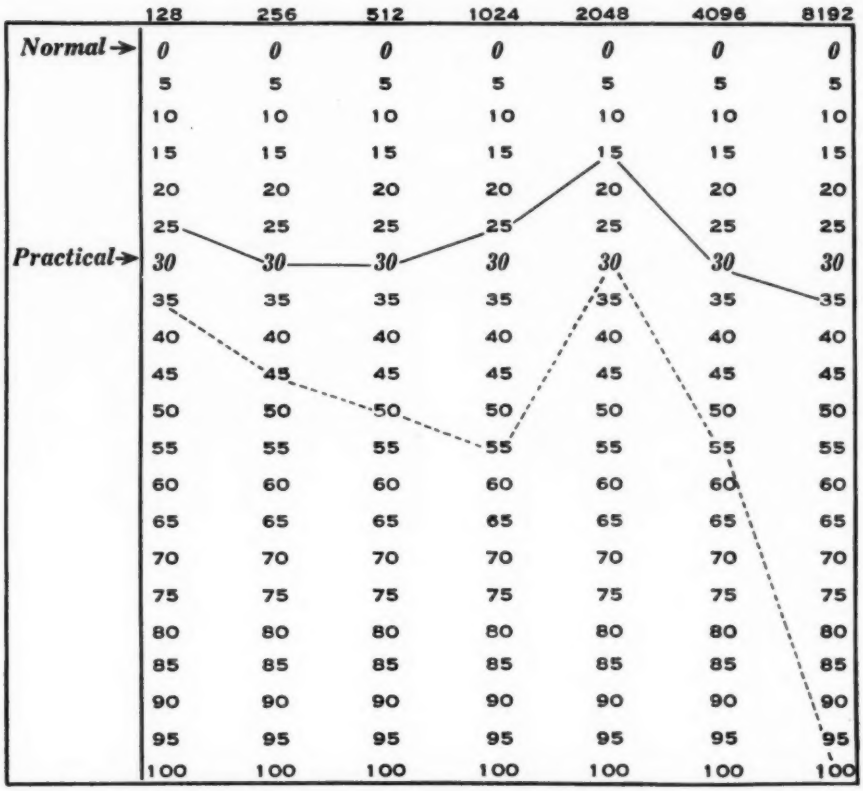

Figure 1*b*. Practical hearing restored and continuously maintained since the performance of the Lempert fenestration operation eleven years ago.

following the fenestration operation, the permanent maintenance of such a result has been found to depend mainly upon our ability to prevent closure of the newly created fenestra by osteogenesis. (Figure 1*b*.)

Postoperative clinical observation of 4,000 fenestration operations which I have performed and the careful study of the newly created fenestra region in 450 revisions, plus the histologic observations made in the experimentally controlled post-fenestrated Rhesus monkeys, have shown that when osteogenesis takes place following fenestration it does so either in the region of the fenestra rim or in the perilymph space and also in both the fenestra rim and the perilymph space. Further investigation of this problem has revealed that osteogenetic closure of the new fenestra is influenced mainly by (1) the site chosen for the creation of the fenestra; (2) the inherent natural tendency for osteogenetic repair of the freshly injured histologic bony layers of the fenestra rim; and (3) bone dust and bone slivers left behind in the region of the fenestra gap and within the perilymphatic space.

SITE FOR CREATION OF THE FENESTRA

In 1938 I described the first practical one-stage technic for fenestrating the labyrinth in clinical otosclerosis and fenestrated in accordance with tradition the external semicircular canal posterior to its ampullated end. Osteogenetic closure of the newly created fenestra made in this region ultimately resulted in about 60 per cent of the successfully operated upon cases (*Arch. Otolaryn.* 28:42-97 [July] 1938). (Figure 2*a*.)

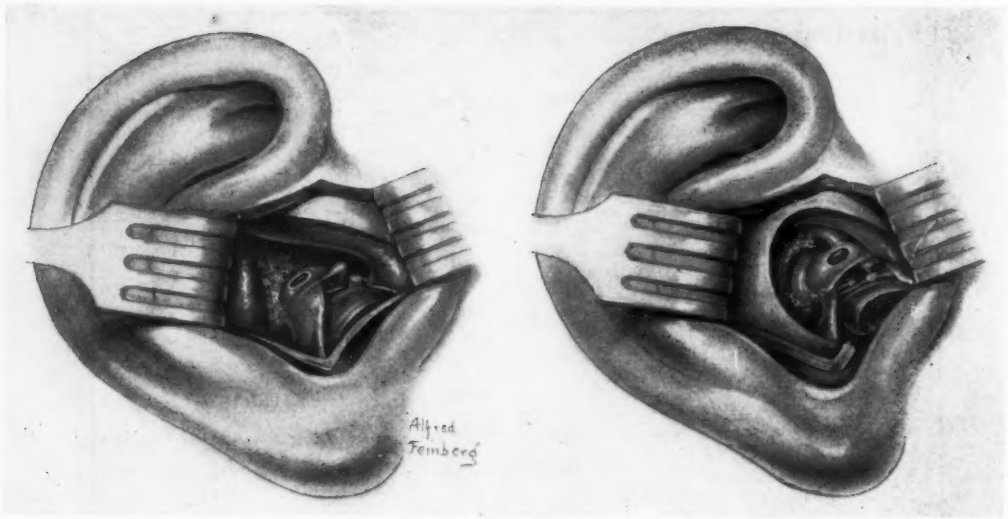

Figure 2*a*. *(Left)* Lempert fenestration (1938). Fenestra was made in the external semicircular canal posterior to its ampullated end.

Figure 2*b*. *(Right)* Lempert fenestra nov-ovalis (1941). Fenestra is made over the surgical dome of the vestibule.

During revisions of these postoperatively closed fenestras I repeatedly observed that the tendency for osteogenic closure was lowest near the ampullated end of the external semicircular canal. Based upon this observation and the reasoning to which it led I decided to move the fenestra site forward. I developed and described the fenestra nov-ovalis technic, whereby the fenestra is created within the surgical dome of the vestibule (*Arch. Otolaryn.* 34:880-912 [Nov.] 1941). This technic has since been universally adopted by otologists interested in fenestration surgery.

The fenestra nov-ovalis technic reduced the number of osteogenetic closures of the fenestra in the successfully operated upon cases to 25 per cent. (See Figure 2*b*.)

OSTEOGENETIC REPAIR OF FRESHLY INJURED HISTOLOGIC BONY LAYERS OF FENESTRA RIM

Controlled animal experimentation has shown that burnishing the freshly cut histologic layers of the bony rim of the newly created fenestra with smooth metal burnishing burrs delays osteogenetic closure of the fenestra, but does not prevent it (*Arch. Otolaryn.* 36:473-490 [Oct.] 1942).

Further investigation of the effect of burnishing the fenestra rim with various metals in the experimentally controlled Rhesus monkey has revealed that burnishing with pure lead prevents osteogenetic closure of the fenestra (*Arch. Otolaryn.* 46:512-527 [Oct.] 1947). (Figures 3 and 4.)

Though animal experimentation and application in the human have shown that physical impedance through the use of inert metal obturators and cartilage stopples can prevent osteogenetic closure of the fenestra, lead burnishing of the fenestra rim has been found to be the simplest and most applicable means of accomplishing it.

The lead burnished fenestra nov-ovalis technic has been exclusively employed in the human during the last twenty-two months. Only 5 per cent of the successfully operated upon cases which are now more than one and one-half years postoperative have shown signs and symptoms suggestive of osteogenetic closure of the fenestra.

Figure 3*a*. Ex. 2. Monkey No. 31. Right experimental ear. Fenestra burnished with pure lead. No bone regeneration seven months postoperatively.

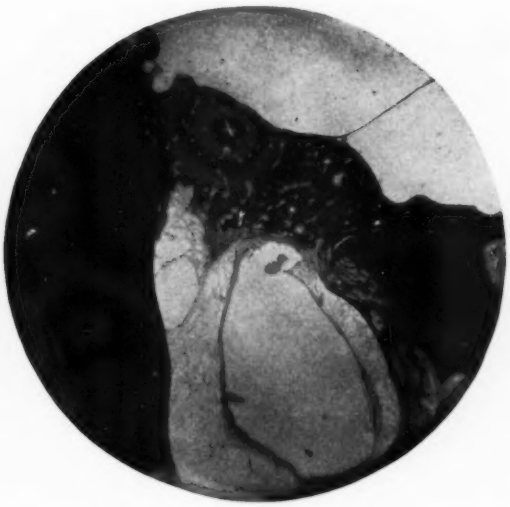

Figure 3*b*. Ex. 2. Monkey No. 31. Left control ear. Fenestra not burnished with lead. Bone regeneration is complete seven months postoperatively.

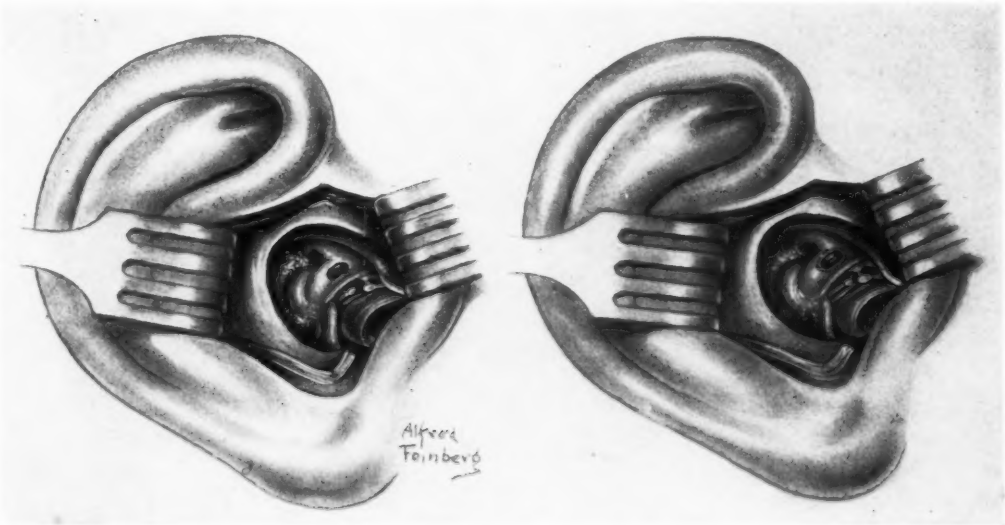

Figure 4*a*. *(Left)* Lempert fenestra nov-ovalis (1941). Fenestra rim was burnished with 22-carat gold burr, which delayed bone regeneration.

Figure 4*b*. *(Right)* Lead-burnished Lempert fenestra nov-ovalis (1947). Fenestra rim is burnished with pure lead which prevents bone regeneration.

Figure 5. Ex. 3. Monkey No. 42. Left. (Six months and one week postoperative.) Perilymphatic endosteal osteogenesis initiated by bone particles unavoidably lost during the process of fenestration within the perilymphatic space. The fenestra proper remained patent.

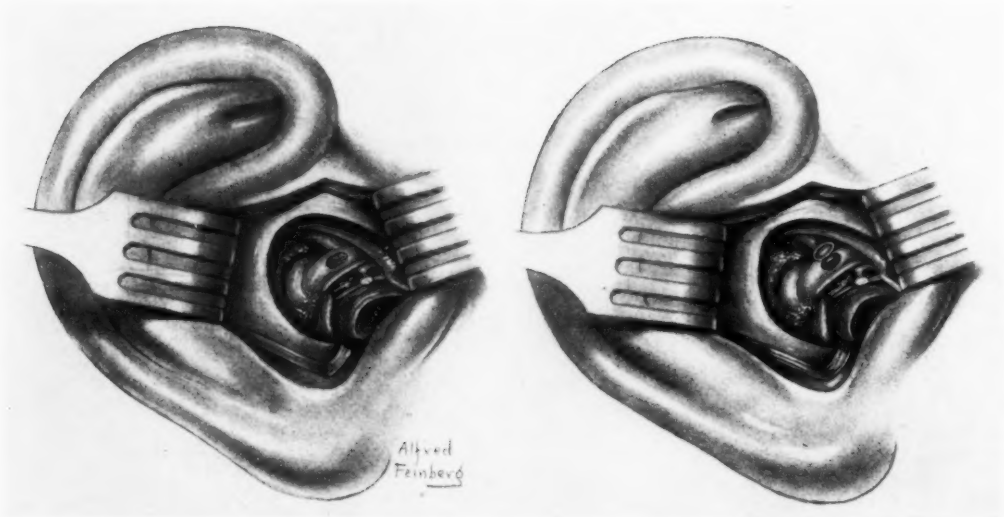

Figure 6*a*. *(Left)* Lempert fenestra nov-ovalis (1941). Fenestra was made by fracturing and pulverizing the final endosteal bony layer of the surgical dome of the vestibule. Bone dust and bone chips were by-products of this technic.

Figure 6*b*. *(Right)* Bone-dust-free Lempert fenestra nov-ovalis (1948). Fenestra is created without fracturing or pulverizing the endosteal bony layer. Instead an endosteal bone cupola is created, its base is incised and the cupola is lifted and removed intact.

BONE DUST AND BONE SLIVERS LEFT BEHIND IN FENESTRA REGION

In the surgical treatment for clinical otosclerosis, bone sand and bone splinters have always been by-products of fenestrating the bony labyrinthine capsule with the electrically driven burr. When the final endosteal bony layer is fractured inward and pulverized, bone dust and bone splinters are pushed in the direction of the perilymph space with most of them coming to rest upon the shredded endosteal membrane and the endolymphatic labyrinth. It has been a well recognized fact that when these bone particles are not meticulously removed from the fenestra region they may stimulate and enhance the naturally existing tendency for osteogenesis in the freshly cut bony walls of the fenestra rim.

It is for this reason that various means of meticulously removing the fractured and pulverized endosteal layer of the bony capsule, which is seen resting upon the shredded endosteal membrane and the endolymphatic labyrinth, are being practiced by otologists doing fenestration surgery.

However, every careful otologist practicing fenestration surgery could not help but observe that in fracturing and pulverizing the endosteal bony layer of the fenestra region, bone dust and bone splinters unavoidably fall into the perilymph space and frequently disappear beyond visualization and retrieval.

Lindsay, after having made similar observations following experimental fenestration surgery in the Rhesus monkey, stated as follows: (*Arch. Otolaryn.* [Nov.] 1947.)

> The histologic examination has demonstrated that although at operation the technic appeared to be carried out faultlessly the complete removal of bone dust and fragments was rarely accomplished.

Observations in the human during revisions and histologic studies of the postfenestrated Rhesus monkey have shown that bone particles, which unavoidably enter the perilymph space during labyrinthine fenestration, when not removed will stimulate perilymphatic endosteal osteogenesis. (See Figure 5.)

Based upon the above observations I developed the bone-dust-free fenestra nov-ovalis technic, which permits the creation of the fenestra without the formation of bone dust or bone chips. The heretofore existing problem of how to best accomplish the removal of bone dust has thus been disposed. (*Arch. Otolaryn.* 47:280-288 [March] 1948). (Figure 6.)

It is logical to assume that the bone-dust-free atraumatic creation of the fenestra will prove to be another great advance towards the final successful solution of the surgical treatment of clinical otosclerosis by still further reducing the percentage of failures.

ALUDRINE IN RELIEF OF ASTHMA

Inhaling a mist of aludrine, a synthetic drug modified from adrenalin, relieves both mild and severe asthma, Dr. Leslie N. Gay and Dr. James W. Long of Johns Hopkins University School of Medicine report, following treatment of 48 patients with the solution. Hand atomizers were used. Patients were instructed to administer five inhalations at the onset of wheezing and to repeat in five minutes if necessary. Patients were able to determine for themselves the number of inhalations needed.

Every patient with mild asthma obtained complete relief after one course of three to six inhalations. Among 19 patients having a moderate degree of asthma, 16 gained moderate to marked relief after two to three courses of four to six inhalations. Of the 21 who had severe attacks, 16 received moderate to marked relief from one to three courses of six to eight inhalations. Most of these were cases heretofore requiring emergency treatment in an outpatient department. Only two extreme cases failed to get some benefit. Five patients who no longer responded to adrenalin responded quickly to aludrine mist.

1948 DEATH RATE OF INSURED SETS LOW RECORD

The death rate among American life insurance policyholders for 1948 will probably set an all-time low record, the Institute of Life Insurance reports. The exact gain will not be known until all data is computed, but preliminary estimates show many thousands fewer policyholder deaths last year than would have occurred on the basis of death rates five years ago. Leading cause of death in the policyholder group, one-third of the total or approximately a half million, was cardiovascular and renal diseases. Nearly 1,350,000 policies are expected to become death claims for the year, a new record high total because of the increase in policies at risk.

Dynamic Therapeutics in Chronic Disease

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On one floor of a better-than-average apartment building in New York's upper West Side, live four families whose incomes are typical for that section of the city. One, a young married couple with a small child, has no particular medical problems; but in each of the other three, at least one member of the family suffers from chronic disease.

In one family, it is a 13-year-old child with rheumatic heart disease. In another, the 48-year-old mother suffers from diabetes. In the third, the grandfather is hospitalized with paralysis, the result of a stroke of apoplexy. An unusual group? No, just an average cross-section, for there are some 23,000,000 persons in this country who have been disabled by accidents or are suffering from disease, and a minimum of several million who are so disabled they can be considered chronic invalids.

Today, as medical science moves forward in the prevention and cure of infectious disease, chronic illness has become the nation's primary medical problem. In 1900, seven chronic diseases (cancer, diabetes, intracranial lesions of vascular origin, diseases of the heart, diseases of the arteries, cirrhosis of the liver, and acute and chronic nephritis) were responsible for 25.7 per cent of all deaths in New York State. Between 1900 and 1940, a period in which the population of New York State increased by 85 per cent and the total number of deaths increased by only 13 per cent, the number of deaths from this group of chronic diseases increased by 200 per cent, and now includes over two-thirds of all deaths in the state.

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Presented November 9, 1948, before the meeting of the Interstate Postgraduate Medical Association of North America, Cleveland, Ohio.

One of the principal causes of the increasing prevalence of chronic disease has been the great advances in medical and surgical care which have prevented death and produced an aging population. Two thousand years ago, the average length of life was 25 years; at the turn of the century, it was 49; today, it is 66. In 1900, one person in twenty-five was 65 years of age or older; it is estimated that in 1980, the ratio will be one in ten. The chances are now two out of three that a young man now starting his working life at the age of 18 will live to his retirement age of 65. A 45-year-old man today has seventy in one hundred chances of reaching the age of 65, and the chances for a 55-year-old man are seventy-eight in one hundred. White men now at the age of 65 can expect to live an additional twelve and one-half years on the average, and white women an average of fourteen and one-quarter years.

As people become older, their medical needs change, and they demand more medical service. In 1940, the 26.5 per cent of the nation's population over 45 required over half the nation's medical services. By 1980, it is expected that the number of persons over 45 will constitute nearly half of the population.

The incidence of chronic disease is definitely related to economic status. It develops most frequently among families of low income, and when it strikes, results in further reduced income and depletion of financial reserves. In the National Health Survey of 1936, chronic illness was found to exist nearly twice as much among persons on relief as those earning $3,000 a year and over. A more recent study in Illinois showed that 23 per cent of all public assistance recipients were chronic invalids. In Connecticut, the percentage was 20, and in New Jersey, 38 per cent of those receiving old age assistance are chronically ill.

Although chronic disease is more prevalent in older persons, authorities state that 16 per cent of all persons with known chronic disease are under 25 years of age. A study at Yale found the percentage to be 33.

As Dr. Ernest P. Boas, an authority on chronic disease, pointed out in the New York Academy of Medicine's report on "Medicine and the Changing Order," there are but two chronic diseases, pulmonary tuberculosis and mental illness, in which their medical care has become an accepted community responsibility. For other chronic invalids there is no well-planned and integrated service. They find refuge in general hospitals, convalescent homes, homes for the aged, and the back bedrooms of relatives.

Much of the acute financial plight of both municipal and voluntary hospitals is caused by the increasing numbers of the chronically ill who enter the hospitals and stay for long periods. Dr. Edward M. Bernecker, Commissioner of Hospitals in New York City, has reported that 22.5 per cent of the general care beds in municipal hospitals in New York City are occupied by patients with long-term illnesses. The percentage in voluntary hospitals is said to be around 20. In a recent survey in Syracuse, New York, it was found that 84 per cent of 902 successive patients in medical wards were chronically ill.

It is agreed that a great many of the chronically ill must have general hospital care initially. Many, however, remain in the hospital purely because of the lack of any place to which they can go if they are discharged. Convalescent or nursing homes are totally inadequate to meet the need, and patients discharged to their homes, where there are no facilities for their care, frequently must be readmitted to the hospital.

HOWARD A. RUSK

One of the great needs is provision for total treatment of the chronically ill patient in terms of his whole problem. Many such patients cannot be rehabilitated to the extent of employability, but a great percentage can be rehabilitated to the point of sufficient self-care so that they are able to live at home, requiring a minimum of aid from other members of the family.

Both the Veterans Administration and some civilian hospital rehabilitation programs have demonstrated that rehabilitation to the point of self-care, and even to full or limited employment, is possible for many of the chronically ill who have been hospitalized over long periods.

Typical of the results obtained in the Veterans Administration Medical Rehabilitation Service is a study of 130 chronic neurologic patients in one hospital, all but two of whom were World War I veterans, and many of whom had not been out of bed in ten years. After nine months of medical rehabilitation, 25 had left the hospital and were employed; 40 others had been discharged to their homes capable of light work, and, of these remaining, 30 were ambulatory and undergoing advanced rehabilitation and 25 were capable of some self-care. All but ten of the group had shown worthwhile permanent improvement. With a five-year life expectancy of these patients, and a per patient day hospitalization cost of over $12, rehabilitation of this one group has saved the government, and eventually the taxpayer, over $1,250,000. It would seem logical that a similar program for the civilian chronically ill would result in comparative savings.

In another study at the Veterans Administration Hospital at Manhattan Beach in Brooklyn, through rehabilitation, 74 of a group of 126 patients suffering from such diseases as arthritis, multiple sclero-

sis, paralysis, and Buerger's, Parkinson's, and heart diseases have been discharged from the hospital and are now at home taking care of themselves. All but 13 of the original 126 patients have recovered all or part of their ability for self-care. At the beginning of this program, 83 of these veterans were "completely hopeless," but 49 of that group have been rehabilitated to the point of complete independence, and the remainder are capable of self-care. However, in most of our civilian hospitals, the patient receives no such services. Hospitals complain that the chronically ill are responsible for their crowding, but they do little to provide many with the training services that will permit them to leave the hospital.

That many general hospitals recognize their limitations is shown by a study made in New York State last year on the medical, social, and institutional aspects of chronic illness. Although almost 70 per cent of the 139 hospitals surveyed accepted chronic patients, relatively few had specialized departments for their care. The great majority frankly admitted trying to avoid their admission.

The problem of providing an integrated service for the chronically ill is a complex one. It affects tremendous numbers of persons, numerous diseases, and types of disabilities, varying types of medical and semi-medical institutions, and, particularly, all community service agencies. There is one facet of the problem that stands out glaringly at the present time. That is the need in our general hospitals for dynamic training programs to enable many of the so-called chronic invalids to live independently within their own homes.

THIRD PHASE OF MEDICINE

The modern concept of the third phase of medicine had its origin in World War II. The military services, during the war, found that through progressive rehabilitation starting at the bedside at the earliest possible moment, hospitalization time could be shortened and readmissions reduced. Among the most significant in a number of clinical studies of this program was that of Van Ravenswaay and his co-workers who studied 645 cases of virus pneumonia treated in the same acute wards and then transferred to alternate convalescent wards. In Ward I, "Nature took its course," and men sat around until they and the medical officer felt they were ready for duty.

In Ward II, the patients were kept in bed until their sedimentation rate reached 10 mm. in one-half hour, and then they were put into a reconditioning program beginning with exercise for one-half hour the first day and increasing progressively until the twelfth day, when the patients were participating in a full five-hour day of physical training, mass games, competitive sports, and active recreation culminating in a ten-mile hike.

Group I averaged forty-five days hospitalization, with a 30 per cent recurrence rate; Group II averaged only thirty-one days hospitalization, with but a 3 per cent recurrence rate.

The modern concept of this third phase of medicine, which takes the patient from the bed to the job, springs both directly and indirectly from the war. The rehabilitation programs of the military services and the Veterans Administration demonstrated that planned, integrated programs of convalescent care stressing activity as an adjunct to definitive treatment could reduce the period of hospitalization, offset the deconditioning phenomena of bed rest, and prevent the harmful psychological sequelae which often result from extended hospitalization. The technics of physical rehabilitation and retraining for the severely handicapped developed by the military services, also have profound implications for the even larger number of our civilian population who are disabled.

EMPLOYMENT OF HANDICAPPED PERSONS

Indirectly, the war also created interest in the third phase of medical care, for because of wartime manpower shortage, many disabled civilians for the first time had an opportunity to take their place on production lines and demonstrate that, with proper selective placement, they were efficient, reliable, safe employees. Prior to the war, many employers refused to hire handicapped workers on the grounds that they were more accident prone than the able-bodied. The industrial accident rate of 87 of the great industrial plants in America, each having from 50 to 12,000 handicapped employees, has proved that concept fallacious. Studies of their experience show that 56 per cent found the accident rate of the handicapped lower than that of the able-bodied; 42 per cent found the rate the same as for the able-bodied; and only 2 per cent found it to be higher.

The Bureau of Labor Statistics of the Department of Labor has recently completed an exhaustive study of the work performance of 11,000 im-

paired and 18,000 matched unimpaired workers subjected to the same job incentives and exposed to the same job hazards. The data taken from industry's own records shows conclusively that the physically impaired person is not necessarily a handicapped worker if given reasonable job placement consideration. The two groups had identical frequency rates of non-disabling injuries, and the average rates of absenteeism showed no significant difference. The impaired workers, however, produced at a slightly better rate, and had relatively fewer disabling work injuries than did unimpaired workers on the same jobs. No matter how different these physically impaired workers may have been in other respects, on the job they were just another group of workers able to meet their unimpaired fellow workers on an equal competitive footing.

It is well recognized that the compensatory laws of nature make adjustments in the abilities of the handicapped worker. We know that the loss of one sense leads to the sharpening of the other senses; that men with no legs develop more capable hands; that men without vision develop their sense of touch to the highest degree. Such compensatory abilities are not automatic; they come only through experience and training. To be of maximum vocational value, their development must be under skilled guidance.

REHABILITATION RESEARCH

Although the underlying philosophy of the third phase of medical care is based on logic and common-sense, basic and clinical research in medical rehabilitation has been minimal until the past few years. Studies done in the military services, the inquiries of Keys, Barr, and others into the deconditioning phenomena of bed rest, the numerous reports of Powers, Whipple, Dock, Menninger, Ghormley, and others on bed rest as it affects their particular specialties are indicative of an increasing mass of scientific data on which such concepts are based. This evidence has been reinforced by the studies of successful experience with the impaired worker in industry, the economic values of rehabilitation as shown by the Office of Vocational Rehabilitation, and the success of the Veterans Administration Medical Rehabilitation Program.

There was, at the war's end, some skepticism of the value of medical rehabilitation in the Veterans Administration hospitals for veterans of World War I and those of the Regular Army who suffered from chronic illness and long-standing disabilities. Some physicians feared that young veterans of World War II would soon lose ambition, initiative, and a desire for personal independence through association with older veterans who had developed "hospitalitis" as a result of boredom, frustration and hopelessness. In the veterans hospitals, where comprehensive, dynamic rehabilitation programs are now in operation, the results have been not only revealing but encouraging.

DISABILITY AMONG CIVILIANS

Although the focus of attention has been centered on the disabled veteran, the extent of disability among our civilian population is far greater. There were 19,000 amputations among military personnel during World War II, but over 120,000 major amputations during this same period among our civilian population. Approximately 1,500 men were blinded while in military service during the last war, but 60,000 civilians lost their sight during this period. Some 265,000 men were permanently disabled as a result of combat injuries during the war, but 1,250,000 civilians were permanently disabled by disease and accidents in the corresponding four years.

There are some 23,000,000 persons in the United States handicapped to some extent by disease, accidents, maladjustment, or war. One third of all draftees were rejected as unfit, and more than 1,000,000 had to be discharged shortly after induction. In 1946, 10,400,000 persons suffered disabling accidents, and of these, 370,000 were disabled permanently. It is estimated that there are over 7,000,000 persons in the United States disabled by diseases of the heart and arteries, 6,850,000 from rheumatism and arthritis, and 2,600,000 disabled from orthopedic conditions.

These are the numbers, but they cannot tell the story of pain, anxiety, suffering, and all of the vital secondary problems that disease and disability leave in their wake. Aside from pain and tearing personal and family anguish, the economic costs of disease and disability are staggering.

Although it would seem logical that medical rehabilitation would be an important service in every civilian hospital, there has been little or no attempt, until recently, to establish such programs in civilian hospitals. Of the 1,468,714 hos-

pital beds in the United States in 1946, 44 per cent were in general hospitals, but these 641,331 beds cared for over 92 per cent of all patients. Rehabilitation, in varying degrees, has been available in some tuberculosis, mental, and other specialized hospitals, but little provision has been made for dynamic convalescent care and rehabilitation of the over 14,000,000 persons who are patients in general hospitals each year.

BELLEVUE HOSPITAL PROGRAM

The first comprehensive, total medical rehabilitation program in any community hospital in this country has recently been inaugurated at Bellevue Hospital in New York. Operated under the professional direction of the Department of Rehabilitation and Physical Medicine of the New York University College of Medicine, the service has bed facilities for 80 patients, and offers a program of physical medicine, physical therapy, occupational therapy, corrective physical rehabilitation, social service, corrective speech, psychologic services, vocational guidance, education, and planned recreation. It operates as a service department to the other departments of the hospital in much the same manner as the x-ray and laboratory, and treats both in-patients and out-patients on reference from the other services of the hospital.

The rehabilitation service in Bellevue Hospital which will be enlarged to 600 beds when the construction planned is completed, is the first step in a plan by the Department of Hospitals of the City of New York to provide all patients in municipal hospitals of the city with medical rehabilitation services. The extent to which rehabilitation has entered into future planning in New York in both public and private hospitals is shown by a recent report of the Hospital Council of Greater New York, in which it was suggested that 25 per cent of the bed capacity of the city's general hospitals should be allocated for convalescence and rehabilitation. This would mean one such bed for each 1,000 of the city's population.

OTHER REHABILITATION FACILITIES

The interest in extending medical rehabilitation services in general hospitals is not limited to New York City or other large urban areas. The Veterans Administration has recently established such services as major departments with bed allocations in all Veterans Administration hospitals.

The New York State Health Preparedness Commission has recommended that the state should build or acquire and support a chronic disease hospital center contiguous to a general hospital, in close proximity to a medical school, and staffed and operated by contract with such hospital and medical school in each of five geographic regions of the state. They have also recommended that "rehabilitation services for disabled and chronically ill be developed as rapidly as possible in selected general hospitals throughout the state by providing the services of trained personnel and by providing funds for the training of needed personnel in this field." Today, throughout the nation, there are some 150 communities which have expressed interest in establishing rehabilitation services either independently or in conjunction with existing hospitals, medical schools, or community agencies. It is significant, however, that most are following the recommendations of The Baruch Committee On Physical Medicine that such centers be medically directed, and be associated with civilian hospitals and medical schools if possible.

This is the pattern being followed in the Institute of Rehabilitation and Physical Medicine which recently opened as one of the first operating units of the new New York University-Bellevue Medical Center. Patterned after the recommendations of the Baruch Committee, the Institute offers a complete program of physical medicine and rehabilitation, including physical rehabilitation and retraining, psychosocial adjustment, and vocational evaluation and guidance for physically handicapped persons. It provides an integrated program of physical therapy, occupational therapy, physical rehabilitation, social service, vocational guidance and testing, and recreation, designed to teach the patient who has a physical disability "to live within the limits of his disability, but to the hilt of his capabilities." With facilities to care for an in-patient census of 30 and a daily out-patient load of 100, the Institute places special emphasis on retraining in elevation, ambulation, crutch-walking, and the physical skills necessary for the activities inherent in daily living.

THE Institute's service and facilities are available to any patient, either on an in-patient or out-patient basis, who, in the opinion of the referring physicians and the Institute's staff, could benefit

Prevocational work experiences in the hospital provide the basis for later vocational rehabilitation.

from rehabilitation and retraining. It is expected that the majority of cases will be those needing definitive physical medicine or rehabilitation as the result of injuries, arthritis, orthopedic and neurological disabilities, and diseases of the heart and arteries. Special facilities are available for a limited number of paraplegics and hemiplegics. Although the Institute is not prepared to do vocational training of the handicapped per se, special workshops are available for vocational evaluation and guidance and job hardening under medical supervision for arrested tuberculous and cardiac patients. Complete vocational and guidance services are available for all types of persons with physical disabilities.

PROSTHETICS SERVICE

One of the special features of the Institute is the Prosthetics Service in which consultation and recommendations are made on the selection, fitting and adjustment of prosthetic devices of all types, and intensive training is given in their use. The Institute does not manufacture or sell prosthetic devices, but has skilled technicians available for services for all types of amputations, and for the minor adjustments and refittings frequently necessary to make artificial limbs more comfortable and efficient to the wearer.

RETRAINING IN PHYSICAL SKILLS

Although we have in this country the finest institutions in the world for definitive medical care and for vocational training, outside of the military services and the Veterans Administration there is but a small handful of civilian agencies and organizations equipped to provide for the patient with a physical disability the necessary retraining in physical skills which are a requisite for later vocational training. The physician in the past has thought too much about the physiological and clinical aspects of the patient's disability. The vocational counselor too frequently has thought only in terms of physical skills which could be utilized

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With special devices and proper retraining even the most seriously disabled can be made partially self-sufficient.

vocationally. Between the two, however, there is a wide area through which most physically handicapped persons must go when their definitive medical care is completed but before they are ready to undergo vocational training. In this area lies the physical retraining in skills necessary for the carrying on of the activities inherent in daily living and common to all types of work.

Except in a few isolated instances, the physically handicapped person must be retrained to walk and travel, to care for his daily needs, to use normal methods of transportation, to use ordinary toilet facilities, to apply and remove his own prosthetic devices, to communicate either orally or in writing. These are such simple things that they are frequently overlooked, but the personal, vocational and social success of the handicapped person is dependent upon just such simple factors.

DIAGNOSIS AND TREATMENT

The practice of rehabilitation for the physician begins with the belief in the basic philosophy that the doctor's responsibility does not end when the acute illness is ended or surgery is completed; it ends only when the individual is retrained to live and work with what is left. This basic concept of the doctor's responsibility can be achieved only if rehabilitation is considered an integral part of medical service. Any program of rehabilitation is only as sound as the basic medical service of which it is a part. The diagnosis and prognosis must be accurate, for it is upon them that the feasibility of retraining is determined.

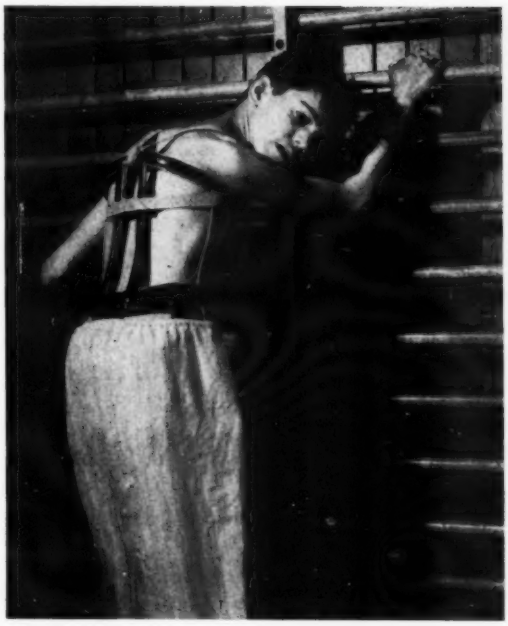
In addition to the general diagnostic studies, the medical evaluation of the orthopedically handicapped must include muscle tests, joint range of motion, and tests for the inherent needs in daily living. In the Rehabilitation Service at Bellevue Hospital, a check list of 96 items is used to determine these factors. They include: (1) bed activities, such as moving from place to place in bed, and the ability to sit erect; (2) toilet activities; (3) eating and drinking; (4) the ability to dress and undress, such as tying shoe laces, manipulating buttons, zippers and other fasteners, and applying and removing braces; (5) hand activities, for example, winding a watch, striking a match, and using various door knobs and latches; (6) wheelchair activities, getting from the bed to the wheelchair, the wheelchair to bed, and in and out of the bathtub; (7) elevation activities, which include the needed abilities for walking, climbing, and traveling.

At first glance, such a test list sounds formidable and time consuming, but in reality, the information may be easily obtained by a therapist, nurse, a well-trained volunteer or a member of the patient's family. From special check sheets used for charting the activity accomplishments, information is readily available both on the status of the patient at the time of admittance and his progress while undergoing rehabilitation.

The use of such a check list is particularly helpful if personnel are not available to do definitive muscle testing and accurate range of motion determination, for the daily activities test can be completed in the hospital, the physician's office, or the patient's home. The subsequent training program is designed to teach the patient the various skills and activities which he cannot perform.

In Bellevue Hospital and the Institute of Rehabilitation, after the basic medical work-up, and the range of motion muscle and needs of daily living test, the physician, in conference with other staff members, prescribes a five-hour-a-day program for the patient. These prescribed activities include training in the ambulation and elevation rooms and the remedial gymnasium, occupational therapy, physical therapy, speech therapy, or any other activity which may be helpful in meeting the specific needs of the patient.

In a comprehensive rehabilitation program, vocational guidance specialists should also be available to do guidance and testing, in order that the patient may be started on a prevocational exploratory and work testing program as soon as it is medically feasible. However, good basic rehabilitation can be carried out with the personnel available in the ordinary general hospital, if such a program is properly organized, supervised, and prescribed by the physician.



For some groups, such as the cerebral palsied, rehabilitation is a long and tedious process but progress can be made.

THE HEMIPLEGIC

The rehabilitation of the hemiplegic is a typical example. There are a number of simple progressive procedures in the rehabilitation of the hemiplegic, one of the commonest disabilities seen in general practice. In the early stages of treatment, the following procedures should be instituted to prevent deformities: (1) Footboard or posterior leg splint to prevent foot drop; (2) sandbags to prevent outward rotation of the affected leg; (3) a pillow in the axilla to prevent adduction of the shoulder; (4) quadriceps setting to maintain muscle strength. All of these procedures are relatively simple and require no special equipment. Their use, however, will prevent crippling anatomical deformities and hasten the rehabilitation of the patient.

The next procedure indicated is the institution of pulley therapy. This can be done very simply with a small pulley attached to a goose-neck pipe over the head

In advising his patient on the selection of a prosthetic device, the physician must realize that not all limbs are suitable for all amputees.

Photographs from: New York University Institute of Rehabilitation and Physical Medicine.

of the bed, using the ordinary clothes-line rope with a one-inch webbing for the hand loop. With the stretching and passive exercise provided by pulley therapy, the range of motion can be increased and adhesions prevented.

Pulley therapy has the advantage over the usual stretching exercises that are done passively, for, the patient, knowing his own pain threshold, will proceed to fully-tolerated motion much more quickly. Pulley therapy can also be used to aid in the re-establishment of reciprocal motion patterns.

The patient, at this stage, should be encouraged to sit erect in order to re-establish balance. Speech therapy, if indicated, should be instituted at this time. In the absence of a trained speech therapist, the speech re-education can be started under medical supervision by any teacher who has had some experience in this field. In the aphasic, it is well for the physician to point out to the patient and family the nature of the condition in order that the inability to use the tools of language may not be interpreted as loss or diminishing of the ability to think and reason.

The next progressive stage in retraining the hemiplegic is ambulation, which should be started by: (1) The practice of balance in the standing position progressing the parallel bars; (2) the teaching of a heel-and-toe gait to minimize clonus and to re-establish normal walking habits stressing reciprocal motion; (3) a short leg brace will be needed in approximately half of all cases to correct foot drop. All of the equipment for training in ambulation is simple and readily obtained by the general practitioner. If parallel bars are not available, two kitchen chairs may be used.

In the advanced stages of retraining, ambulation is continued with: (1) Instruction in crutch walking, starting usually with the alternate four point gait;

(2) teaching elevation, stressing climbing steps, curbs, stairs, and ramps. Concurrently with training in ambulation, attention should be given to retraining in the activities of self-care and daily living.

Obviously, the physician himself cannot undertake the actual administration of the retraining, but the therapist, nurse, volunteer or even a member of the family can conduct the activities under his supervision. With such a program, many of the complications usually following apoplexy can be avoided and a great deal of time and ability salvaged.

THE AMPUTEE

Although the general practitioner is forced to call upon the services of medical specialists when dealing with amputee patients, he must assume the responsibility for preparing his patient physically and psychologically for the amputation and to see that the patient has the proper prosthetic device adequately fitted and is trained in its use.

One phase of the management of the amputee to which the physician should give particular attention, is the immediate postoperative period while the stump is being shrunk in preparation for both crutch walking and the later use of the artificial limb, and measures should be taken to prevent anatomical deformities.

For example, it is not an uncommon practice in many hospitals, following an above-knee amputation, to elevate the stump upon a pillow. However, if such elevation is maintained for as long as two weeks, a flexion deformity will occur which will take from six to eight weeks of arduous, painful work before sufficient hyperextension can be regained for satisfactory walking.

In advising his patient on the selection of a prosthetic device, the compensation physician must be aware of the fact that not all limbs are suitable for all amputees. In fact, he must realize that not all amputees can wear artificial limbs profitably. It has been noted on the rehabilitation service at the New York University College of Medicine that an above-knee amputee in the older age group cannot, as a rule, profitably be trained to use a prosthesis if he is unable to perform a swing-through gait on crutches.

The physician must point out objectively to the patient those skills which the patient can expect to achieve with proper training, and those skills which the patient has little chance of ever regaining. Extreme caution must be taken in the latter, however, as it is unwise to tell a patient "he can't do," for this cannot be determined, in most cases, until the patient has had adequate training. Training is absolutely essential if the amputee is to be successfully rehabilitated.

Regardless of the type of disability, the responsibility of the physician, the hospital or the clinic to the patient cannot end when the acute injury has been cared for. It ends only when the physician, the hospital or the clinic has taken the responsibility for seeing that proper referral has been made to those agencies and institutions which are equipped to rehabilitate and retrain the patient with a residual physical disability; medical care is not complete until the patient has been trained to live and work with what he has left.

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Lung Pathology and Hemoptysis in Children

EFFECT OF NON-OPAQUE FOREIGN BODIES

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THIS dissertation and the four clinical case reports being presented are primarily: (1) to call to your attention the importance of carefully taking a history in all children who suddenly develop choking, gagging, coughing, or wheezing followed by a symptomless period, and who later evidence signs of some lung pathology; (2) to remind you what might happen to a child if you fail to heed this advice, and to help you to realize the significance of the symptoms; (3) to stimulate you to act early in every case in which you suspect that a child has aspirated a foreign body, and to institute a diagnostic bronchoscopic procedure.

I have often made the statement that the most illiterate or ignorant parents will frequently make a correct diagnosis of their ailing child if one only will take the time to listen rather than to ignore them, and mistakenly proceed with symptomatic treatment.

There are numerous causes for hemoptysis in children, probably the most common being bronchiectasis and lung abscess of foreign body origin. It is my desire to call to your attention the horrible experiences an innocent, helpless child can suffer due, in many instances, to a physician who has failed to take a careful history, and, through carelessness, has overlooked the fact that the child might have aspirated a foreign body into a bronchus. In every case of lung pathology in which there is any suspicion of a foreign body as etiologic agent, a bronchoscopic examination is indicated. Early diagnosis and removal of the foreign body, either bronchoscopically or by the chest surgeon, is the only treatment which will bring about a rapid convalescence.

In three of the clinical case reports herein described, the physicians who were called to examine and treat the children are, to my personal knowledge, capable physicians, and they probably could be held responsible for the physical pain and suffering endured by these children and the mental suffering and expense to the parents. However, many children are not seen early by the physician, and the only treatment they receive for chronic productive cough is at the hands of the druggist, neighbors, or friends. Not until the child has coughed up blood in some quantity is a doctor called. This was the story in one of the clinical cases to be described.

A carefully taken history should make the physician immediately suspect the cause of the symptoms presented might be the result

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of an overlooked exogenous foreign body. The next order of business should be a thorough general physical examination and laboratory examinations including x-ray pictures. A bronchoscopic examination should follow next, secretions collected for study if present, iodized oil instilled for bronchography if indicated, and other measures instituted when necessary.

PAUL I. MAHONEY

CLINICAL REPORTS

CASE NO. I

White, male, 10 years old, admitted to St. Vincents Infirmary July 24, 1939, whose chief complaint was chronic, persistent cough with recent expectoration of large amounts of blood. For some months expectoration was streaked with blood, but recently the bleeding became rather profuse. The boy was in very good health until eighteen months before when, while playing in a small cedar tree, he suddenly became choked on a small piece of cedar he had in his mouth. Gagging and choking excited him so that he fell from the tree, injuring his side. He was taken to a physician who ignored the history and proceeded to strap his chest, stating that several ribs had been broken by the fall. He assured the mother the twig had either been swallowed or coughed out.

Soon after, the child developed a cough which at times was streaked with blood and for which the physician prescribed. Not until eighteen months following the accident, when the bleeding became profuse, was the child brought to Little Rock and admitted to a hospital. The boy was not critically ill, and a general physical examination was negative. A diagnostic bronchoscopy was done and the entire tracheobronchial tree was visualized as far as possible through a bronchoscope. Scant, foul-smelling blood tinged secretions were aspirated for study. A small amount of iodized oil was instilled for the purpose of bronchography (see Figure 1).

Surgical treatment was recommended but refused, and the child was returned home. A few months later the child expelled a piece of cedar following a violent coughing bout, and subsequently made an uneventful recovery. The piece of cedar was sent to me, and it appeared as though it had just been removed from the tree. I have seen this boy several times the past few years, and he has had no further respiratory symptoms.

Comment—Had bronchoscopy been instituted early it is highly possible that the foreign body would have been visualized and removed. The mother informed the physician what was wrong, but acting on impulse rather than better judgment he ignored the history and instituted symptomatic treatment. The child paid the price.

X-ray Report 7/24/39—Two films of this patient's chest were taken, one a posteroanterior, the other a left lateral exposure. These films show iodized oil injected into one of the branches of the left main bronchus reaching the anterior inferior part of the left lower lobe. This does not show any signs of bronchial dilatation suggesting a bronchiectasis. It does show, located very near the surface of the lung,

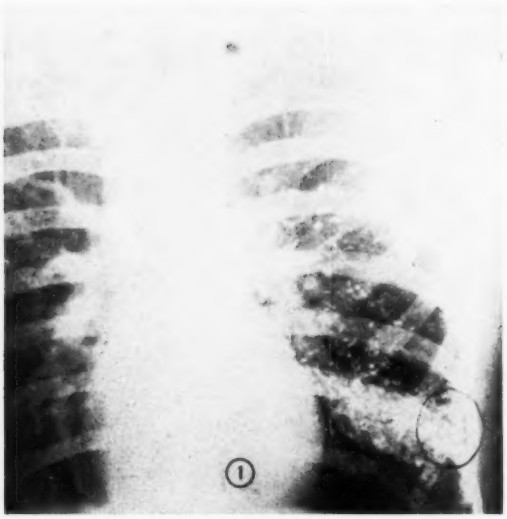


Figure 1. Roentgenogram of patient in Case 1.

a spherical area of iodized oil, about 1.5 cm. in diameter. The film suggests there might be a small excavation at that location. Except for this one small area, these films were entirely negative for signs of infection or other disease. The cause for this shadow is unknown (see Figure 1).

CASE NO. 2

White, male, 5 years old, admitted to the Arkansas Children's Home and Hospital in November, 1944. Chief complaint was cough of several months' duration. The onset was not unusual according to the physician who was called to treat the child and who referred him to the hospital for further study. All routine examinations were accomplished and a diagnosis of chronic tracheobronchitis was made. Treatment was given and the child was discharged from the hospital one week later.

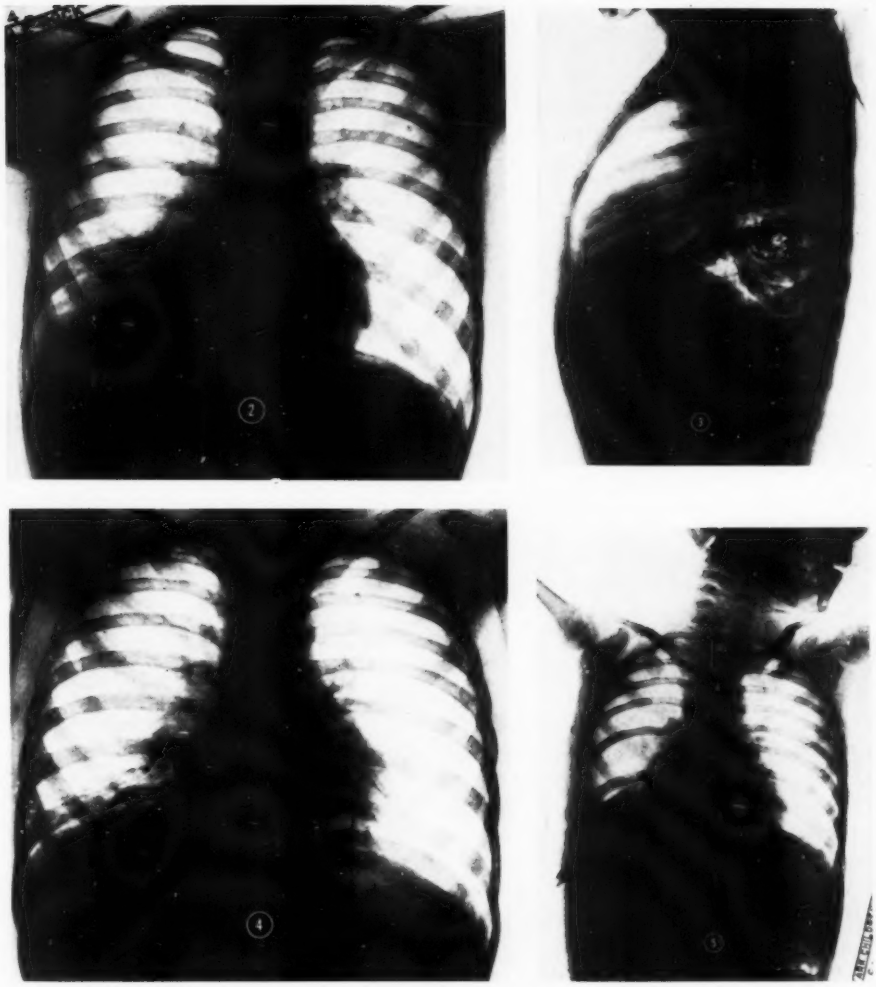
In May, 1946, the child was re-admitted with fever, cough, and pains in the right side of the chest. Dr. John Agar did a diagnostic bronchoscopy and reported the right main bronchus to be filled with foul-smelling, thick pus. The mucous membrane was thickened, inflamed, and a small amount of blood was noted. A diagnosis of bronchiectasis was made, treatment was given, care was outlined, and the child was discharged from the hospital with instructions to return for further observation.

The third admittance was December, 1946. The cough was very productive, the sputum was blood streaked, and had a very foul odor. I was called in consultation January 1, 1947. After a review of the chart I repeated the diagnostic bronchoscopic procedure. Following aspiration, iodized oil was instilled for bronchography. After a review of these films a lobectomy was recommended. This procedure was carried out by Dr. Harvey Shipp on January 16, 1947, and a rice straw head was recovered at this time.

Comment—When the rice straw head was recovered at the time of operation and later shown to the parents and an older brother, the true story concerning the etiology was confessed. Several months preceding the child's first admittance to the hospital, he and his brother were riding on a rice wagon against the advice of their father, and it so happened that the younger child aspirated a rice straw head and nearly choked to death. Having been warned that they would receive a good whipping if they were ever caught riding rice wagons, they had never divulged the incident to their parents. In this particular case it was impossible to obtain an accurate history at a time early enough to make proper recommendations (see Figures 2 to 5).

CASE NO. 3

White, female, 10 years old, admitted to St. Vincents Infirmary August 8, 1947, complaining of expectorating large quantities of blood. She gave a history of being in good health until three months before when she began having an elevation of temperature as high as 104°F., accompanied by nausea. She had an appendectomy at this time with no relief of symptoms. About two weeks later she expectorated a small amount of blood, and then developed a non-



Figures 2 to 5. Roentgenograms of patient in Case 2.

productive cough which persisted until the date of admission to St. Vincents Infirmary, at which time she was expectorating large quantities of blood.

The mother stated that her daughter had been returning home from school accompanied by her teacher, and that she had a wild wheat head in her mouth which she either aspirated or swallowed. She immediately began gagging and choking, but shortly thereafter her symptoms abated, and her mother was advised by a physician that the child had simply choked on the piece of wheat and swallowed it. This was about one week prior to onset of nausea and temperature elevation.

On the date of admission to the hospital the child was pale, cyanotic, and expectorating considerable blood. There was dullness to percussion over the right lung base, and râles were heard in this area. The hemoglobin was 49.8 per cent; R.B.C. 2,800,000; W.B.C. 17,300; temperature 104°F.; pulse rate 160. She received blood transfusions, plasma, and penicillin.

Four days after admission a diagnostic bron-

choscopy was done and blood was seen to be coming from the lower right lobe. Lipiodol was instilled. X-ray showed an abscess cavity in the base of the right lung along the mediastinal aspect and below the lung root.

After several days of treatment the child improved sufficiently to permit operation. Dr. Henry Hollenberg and his associate, Dr. Robert Jones, removed the right sixth rib and opened the chest. The lower lobe of the lung was found to be very adherent in the sulcus and posteriorly. In freeing this at the sulcus a small cavity was opened, and a wild wheat head, about one and a half inches in length, immediately showed itself and was removed, apparently intact. A lobectomy was thought to be indicated prior to opening into the abscess, but inasmuch as only a small portion of the lower lobe appeared to be involved, a partial lobectomy was done.

Following operation there was a marked hematuria for three days which probably was the result of the blood transfusions. Otherwise she improved rapidly. On the fourth postoperative day a routine chest film was made. This showed the iodized oil still present in the cavity along the mediastinal aspect of the right lung with no noticeable change from the earlier film, except for the operative defect.

One month later the child again was operated upon, and a portion of the ninth rib posteriorly was removed. The lung was adherent to the pleura. The lung was opened bluntly in this area, and two dark flecks of oiled necrotic tissue were removed. A vaseline gauze wick with a metal marker attached at the end was inserted in the cavity for drainage. An x-ray film showed the marker to be in the center of the abscess.

Since operation there has been very moderate purulent drainage which is gradually subsiding. The drainage opening has been allowed to fill in from within outward, and at the present time has completely filled in. The temperature and pulse have remained within normal limits for a period of two weeks, and her general well being has returned to normal.

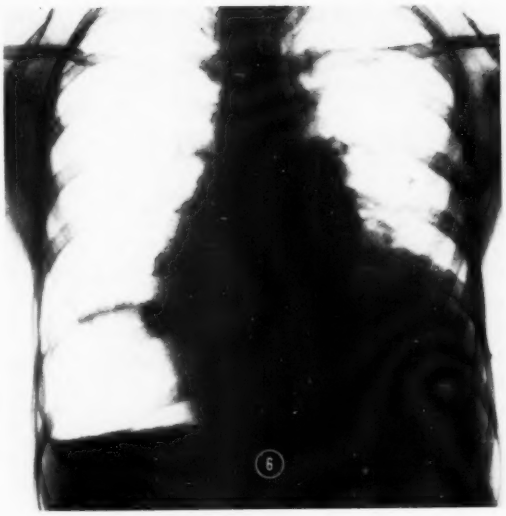
Comment—The child and the teacher knew that the cause of the trouble was the sucking of a piece of wild wheat head into the windpipe. They conveyed this information to the mother who, in turn, told the physician. Had the physician only paid more heed to this positive history, the child probably would have been spared the procedures enumerated (see Figures 6 to 9).

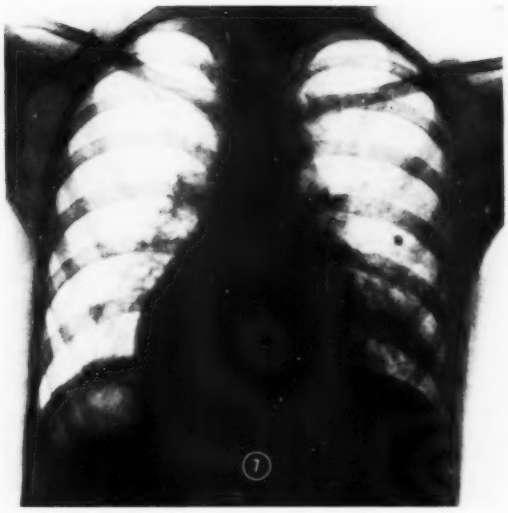
CASE NO. 4

WHITE, male, 12 years old. He was admitted to Baptist State Hospital on September 12, 1947, with a chief complaint of pain in the left anterior chest associated with swelling and partial paralysis of the left arm, accompanied by a moderately productive cough.

Ten months before admission to the hospital this patient contracted a severe upper respiratory infection which was diagnosed as influenza. This infection subsided, and the boy was able to go back to school approximately three weeks after the onset. His cough, however, persisted. Three weeks later he again had an attack of so-called influenza which persisted for two weeks. He returned to school and was able to stay in school for four weeks. An acute exacerbation of influenza again required his confinement to bed for approximately one month. Two weeks before admission he complained of pain in the region of the left breast and his parents noted a large, firm, tender mass in this area. His local doctor put him into bed for a short time. The mass increased in size and tenderness in ten days and caused a partial paralysis of the left arm.

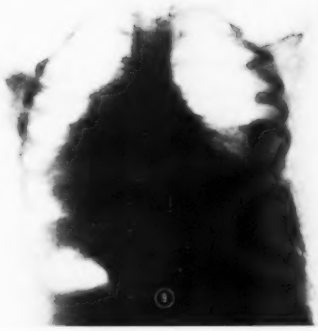
On physical examination his temperature was 99.8° F., pulse 100, and respiration 26. The left chest showed evidence of a reddened, inflammatory mass beneath the medial portion of the pectoralis major muscle. Auscultation over this area, posteriorly, revealed the presence of moist crepitant râles. There was percussion dullness over this area, in about the second to third intercostal space. There was some edema of the pectoralis major muscle causing voluntary limitation of motion of the left arm. This was not found to be a true nerve paralysis.





Figures 6 to 9. Roentgenograms of patient in Case 3.

Figures 10 and 11. Roentgenograms of patient in Case 4.



Laboratory studies revealed a white count of 18,900; differential of: 3 stabs, 70 polys, 27 lymphs. The red count was 4,350,000 with a 75 per cent hemoglobin. Urinalysis was negative. X-ray examination revealed a widening of the hilar shadow on the left side with strands of fibrosis and hyperemia extending outward from this area. A bronchoscopic examination was done and purulent material was found draining from the left upper lobe bronchus. Lipiodol instillation was carried out and an x-ray examination was made, which revealed a massive cylindrical bronchiectasis limited to the lingula of the left upper lobe with abscess cavities lying adjacent to the anterior chest wall in the region of the inflammatory mass. Sputum examination revealed large numbers of staphylococci.

Incision of the tumor mass was made down to the intercostal muscle bundles and biopsy of the tissue was taken which was reported as edematous and inflammatory tissue. No frank pus was obtained. This boy was placed on aerosol streptomycin inhalation. His general condition improved, and temperature returned to normal within approximately one week. The character of the sputum cleared and his cough disappeared. His appetite improved and he began to gain weight. Due to the fact that there was slight drainage and delayed healing of the incised tumor mass on the anterior chest wall, he was sent home for a period of two weeks, after which he was supposed to return for lobectomy.

This patient was re-admitted to the hospital on October 4, 1947, in a very markedly improved condition. His cough had subsided and he had no fever, but the bronchiectatic cavity still persisted. On October 7, segmental resection of the lingula was carried out without difficulty by Dr. Harvey Shipp. Lying within the bronchiectatic abscess against the anterior wall was found a cedar leaf approximately one inch in length.

Postoperative recovery was uneventful and without complication. The patient was discharged from the hospital on October 25, 1947. At the present time all symptoms have subsided, and the patient is entirely well. He returned to school on November 17 (see Figures 10 and 11).

Comment—This was a case of a non-opaque foreign body lodged in the lingular lobe of the left lung, a most unusual site for a foreign body of this nature. History of the aspiration of this foreign body was not obtained until a week following admission to the hospital when the mother happened to recall the incident. This case again illustrates very well the need for careful history in all cases of persistent lung infection, and for utilizing all available diagnostic procedures.

CONCLUSIONS

1. Carefully taken histories are of paramount importance in all cases of lung pathology.
2. Early bronchoscopy and bronchography are of inestimable value in cases of aspirated non-opaque foreign bodies.

WRIST-BONE FILMS REVEAL DISEASE CONDITIONS IN CHILDREN

Roentgenograms of the wrists are a valuable aid in diagnosis of children, a study published in the *American Journal of Diseases of Children* by Dr. M. G. Peterman, Dr. W. B. Frey and Dr. J. D. Kaster indicates. Such conditions as mental retardation, thyroid deficiency, lead poisoning, and other abnormal processes can be discovered by examining the maturation of the wrist bones.

A study was made of x-ray films of the wrists of 684 children. It was noted that delayed ossification was associated with mental retardation, congenital heart disease, cerebral birth injury, pancreas disease, and hypothyroidism. Other conditions uncovered by the technic include syphilis, tumors, rickets, and scurvy. In the study, the films showed evidence of a pathologic process in 69 cases.

Delayed ossification, brought to light in the x-rays, can result in early discovery of diseases in clinically obscure stages. In borderline cases of hypothyroidism, for example, retarded bone maturation nearly always is present.

DIAGNOSTIC CLINIC

Digestive Diseases

WALTMAN WALTERS*

MAYO CLINIC, ROCHESTER

It is a pleasure for me to be here again and to present to you some cases of digestive diseases. I have been fortunate indeed in having the help of Dr. McNally and Dr. Stoner, who have briefed these cases in an excellent manner. We plan to put on a combined clinic for you to see how it works out.

We have 4 interesting cases. Dr. McNally, will you please briefly outline the first case?

DR. MCNALLY: This is a 72-year-old white man whose general condition is only fair. He has a moderate amount of cerebral arteriosclerosis.

For twenty or thirty years he has had "stomach trouble." He claims to have excessive amounts of gas and heartburn. This is relieved primarily by the ingestion of milk and baking soda. Three days before admission he first noticed tarry stools as well as severe, constant epigastric pain.

On admission he was found to have moderate secondary anemia, the hemoglobin content being 10 gm. per 100 cc. of blood; the stools were tarry in color and positive for blood. He had some tenderness in the epigastric region, but no masses were palpable. A roentgenogram revealed a prepyloric lesion on the lesser curvature. The patient has responded to medical therapy.

DR. WALTERS: Will you describe the roentgenogram of the stomach, please, Dr. Stoner?

DR. STONER: There is a lesion in the prepyloric region of the stomach. There is a filling defect present.

DR. WALTERS: This 72-year-old gentleman gives a history of dyspepsia of twenty years' duration. He has known that he has had disease of the gallbladder and gallstones for a long time, he says, but it is just recently that he has been aware of the lesion in his stomach, the diagnosis being made on examination.

You will note that Dr. McNally spoke of his intestinal bleeding, his marked secondary anemia. He has 2,500,000 red blood cells and 11 gm. of hemoglobin.

The patient and I have talked together for a few minutes and I want him to talk with you because I want to have you help me decide what you think is the best thing for this man to have done. There is one additional study that would have been helpful, namely, a determination of gastric acids. This has not been possible because of a little difficulty in cooperation and also because of some gastric retention. Such a determination would have been helpful, because if the acids are minimal or absent the probabilities are that the lesion is neoplastic. On the other hand, if the acidity is high, that is, more than 45 clinical units of free hydrochloric acid, the probabilities are only 5 per cent that the lesion is malignant. That is important in this case, because we have to decide how this 72-year-old man is going to be treated. We have made the diagnosis of a prepyloric gastric lesion.

How have you gotten along in the hospital under the treatment you have had?

PATIENT: Just fine. I am getting along fine.

DR. WALTERS: Do you think you have had enough trouble so you want to be operated on?

PATIENT: No, I can't be operated on.

DR. WALTERS: Do you think if we could assure you that after an operation you wouldn't have any more trouble with your stomach you would be willing to be operated upon?

PATIENT: Why, yes, that is different.

DR. WALTERS: I wanted you to hear him talk in order to note his weakness and senility.

Nothing at all abnormal is to be felt in the examination of his abdomen. The patient does not work, is not active physically, and under

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Presented November 11, 1948, before the meeting of the Interstate Postgraduate Medical Association of North America, Cleveland, Ohio.

WALTMAN WALTERS

these circumstances he gets on fairly well.

I am sure you can understand why I had him talk to you. He is arteriosclerotic, he is not working, and the high risk of operation in this case is questionable in its justification, because (1) he doesn't want it, and (2) after it has been done at an unusually increased risk because of his arteriosclerotic, weakened, anemic condition, the chances of his being productive in any way are not good; therefore I could not advise this man under these circumstances to be operated upon.

On the other hand, from the standpoint of the general principles of treatment, if this patient were in better physical condition and if he could be operated upon with a reasonable risk, he should be operated upon, for two reasons. First, in spite of the fact that we do not know what the values for his gastric acids are, he has a gastric ulcer which, as a rule, can be successfully removed by operation, and second, there is a 20 per cent chance that the lesion is an ulcerating carcinoma whose cure depends on early operation.

In regard to gastric ulcer I want to call your attention to two things. First is the risk, and second is the effectiveness of partial gastrectomy for gastric ulcer. If the removal of a benign chronic ulcerating lesion in the stomach can be done at a risk of, say, 1 or 2 per cent, and if with this operation the results are excellent in practically every case (I have never seen a recurrence of a gastric ulcer after a properly performed partial gastrectomy), then there seems to be no reason at all why one should deny the patient with a chronic recurring gastric ulcer whose condition will permit an operation, the opportunity of cure by means of partial gastrectomy.

THE possibility that a gastric ulcer may be malignant should always be kept in mind. In a study of a series of cancers of the stomach which my colleagues, Dr. Gray, Dr. Priestley, and I, with the assistance of Dr. Everett Lewis, made several years ago, almost one-third of the patients operated upon for cancer of the stomach gave an ulcer-like history, and the worst part of it was that, of that group of patients who had ulcer-like symptoms and yet had cancers of the stomach, more than two-thirds had temporarily responded effectively to medical treatment.

It used to be said that the response to medical treatment of a peptic ulcer (a term I don't like because there is a decided difference between gastric ulcer and duodenal ulcer) can be used as an indication of whether the lesion is benign or malignant. That is not true, as you see in the case of a lesion in the stomach shown in Figure 1.

I want to stop for a moment and speak about the malignant lesions of the stomach, because my colleagues and I are happy over the results reported last year. When we first started doing total gastrectomies fifteen years ago, the mortality rate was 25 to 35 per cent (last year at the clinic it was 5.3 per cent) whereas the mortality rate from partial gastrectomy in the large series I just mentioned averaged 14 per cent (last year it was 6.4 per cent). What is the explanation for that? Improvement in technic? Well, possibly. Greater experience? Probably. Other factors are the better preparation of patients for operation by the administration of blood, proteins, vitamins, and so forth, and probably a little better understanding of the abnormal physiologic changes occurring subsequent to an operation of this magnitude when a patient has symptoms of gastric retention, hypoproteinemia, anemia, and infection which we sometimes see after an extensive operation.

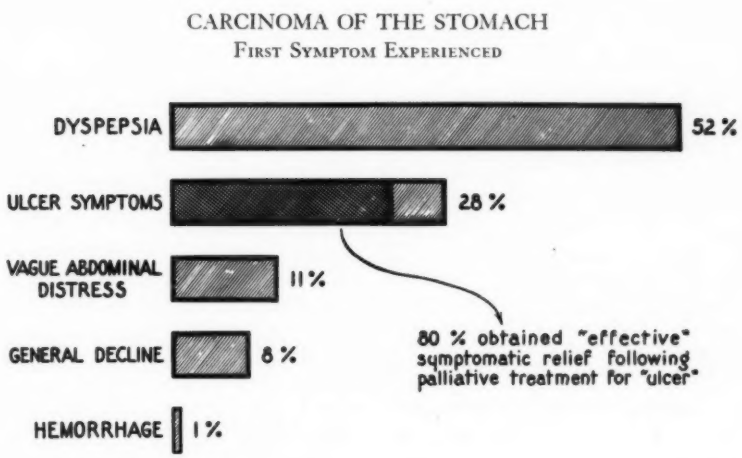

Figure 1. The figure refers to the first presumptive symptom caused by the gastric carcinoma. In over 50 per cent of the cases, indigestion was the first disturbance noted; in almost 30 per cent, it was recurrent pain of ulcer-like character. The vagueness of the early symptoms is one of the reasons for late diagnosis.

We will now discuss the next 2 cases. Dr. McNally, let me ask you one or two questions in order to save time.

This lady is 74 years of age. She has, as you see, a marked degree of jaundice. Dr. McNally, did this jaundice appear after pain or did it occur with increasing intensity and without pain?

DR. MCNALLY: The latter, with increasing intensity.

DR. WALTERS: Painless, progressive jaundice in a woman 74 years of age.

DR. MCNALLY: That is right.

DR. WALTERS: What are the next two or three very important things we want to find out?

DR. MCNALLY: The color of her urine and stools.

DR. WALTERS: What were those colors?

DR. MCNALLY: The urine became progressively darker and the stools progressively lighter until they were clay-colored in appearance.

DR. WALTERS: In the physical examination, what of importance is to be looked for?

DR. MCNALLY: The possibility of a palpable mass in the abdomen, which was found.

DR. WALTERS: In what position?

DR. MCNALLY: In the right upper quadrant extending almost to the umbilicus.

DR. WALTERS: The size and shape of the mass?

DR. MCNALLY: It was about 6 cm. in diameter and was globoid in shape, firm and nontender, and moved with respiration. It was believed to be a distended gallbladder.

DR. WALTERS: What is your diagnosis?

DR. MCNALLY: This patient came into the hospital the day before yesterday, and it is felt that she possibly has a carcinoma of the head of the pancreas.

DR. WALTERS: What would your treatment be?

DR. MCNALLY: I think the treatment in this case is exploration to determine the possibility of pathologic changes in the pancreas. If it is a malignant lesion, or if it represents possibly chronic pancreatitis with obstruction of the common duct, a short-circuiting, I think, would be indicated.

DR. WALTERS: Good! That is exactly what I think, too. You wouldn't attempt to do a radical resection of the head of the pancreas? Let us say there is pretty definitely a hard tumor in the head of the pancreas, would you or wouldn't you try to do a radical resection of the head of the pancreas?

DR. MCNALLY: I suppose I should have qualified my statement by saying that without evidence of extension to other viscera or nodes in the immediate region, I might change my stand, but I think possibly in view of her age I would do a biopsy

and a short-circuiting operation.

DR. WALTERS: Good!

One can notice the scratch marks on her abdomen, and one can feel the globular mass which Dr. McNally described. One of my colleagues, Dr. Eusterman, several years ago called attention to the fact that sometimes when one cannot feel these globular distended gallbladders, if the patient is given a little sodium amytal intravenously (amobarbital sodium) there is an increase in relaxation of the abdominal wall muscles and one can feel about 60 per cent of the distended gallbladder.

I WOULD like to say a word or two about the treatment of malignant lesions of the head of the pancreas. My colleagues, Drs. Waugh and Clagett, have recently reported 38 cases of radical resection of the head of the pancreas for carcinoma. Roughly, the patients can be divided into those with cancer of the head of the pancreas and those with cancer of the ampulla. In cancer of the head of the pancreas, the prolongation of life beyond that associated with the short-circuiting operation which Dr. McNally spoke of does not warrant, in most cases, the very great increase in the risk of radical resection.

As a matter of fact, in 11 of the cases in which radical resection was done for carcinoma of the head of the pancreas and in which the patient obtained only palliation, the subsequent life averaged eight months, whereas in 3 patients with carcinoma of the ampulla of Vater, palliation was obtained for an average of thirteen months. Of the 3 patients with carcinoma of the head of the pancreas that were still alive, the average survival was eighteen months; of the 5 patients with carcinoma of the ampulla of Vater still living, the average survival was twenty-eight months.

If you speculate on the reasons for that you will probably understand it. I say "probably" because we have no definite evidence yet. When one deals with a neoplasm in a ductless gland, for which a subtotal removal of the gland is done, I think that there will always be a high incidence of recurrence.

Now, Dr. McNally, the next patient.

DR. MCNALLY: This is a 70-year-old white woman who was admitted to City Hospital in August with a history of vaginal bleeding of three years' duration. Biopsy of the cervix revealed a partially differentiated squamous-cell carcinoma. She received a course of radiation therapy and was readmitted to the hospital with the development of jaundice.

During her first admission she underwent blood transfusion four times and received one unit of plasma.

DR. WALTERS: This lady is jaundiced. She has bile in her stools. She does not have much bile in her urine, which rather definitely puts the jaundice on the basis of an intrahepatic block rather than an extrahepatic block. However, with the history which you have heard regarding the lesion of her cervix, with recurrence, and with a mass in the right upper quadrant of the abdomen, the probabilities are that we are dealing with a metastatic lesion. Differential diagnosis, peritoneoscopy if one wishes, or biopsy of the liver would tell whether the lesion is intrahepatic or extrahepatic.

Treatment in either event is difficult. Therefore, I think the best thing to do is to carry on the present treatment. The jaundice is receding. The mass is quite evident and she has fluid in the abdomen.

Dr. McNally, can you tell us briefly what the symptoms of the next patient are?

DR. MCNALLY: This is a 22-year-old colored girl who had her first attack of epigastric pain, which was in the right upper quadrant and sharp, after ingestion of fatty foods at times or, at other times, during the night with no antecedent cause. She has had an aversion to fatty foods for four years.

She was in the hospital once last year, where she underwent a work-up, and again this year, for the same complaint with a further work-up.

DR. WALTERS: Dr. Stoner, please point out what there is of significance in the roentgenogram of her abdomen. What do you think that shadow represents?

DR. STONER: Calcification in the head of the pancreas.

DR. WALTERS: Good. Thank you.

We have a young woman with a history of frequent attacks of right upper quadrant pain which have been disabling at times. Also, perhaps you notice she has a normally functioning gallbladder on roentgenologic examination of the gallbladder which has been repeated recently, and again the results are negative.

(To the patient) I want you to tell me where that pain was when you had it. (She has a little pelvic infection, too, but let's disregard that.) Is the pain bad?

PATIENT: The pain is bad.

DR. WALTERS: Does it go through to the back?

PATIENT: It goes through and into the back.

DR. WALTERS: There are no abnormal masses to be felt in the examination of her abdomen. There is some tenderness to pressure in the epigastrium and in the right upper quadrant. Has it been pretty sore?

PATIENT: Yes.

DR. WALTERS: Can you eat everything you want?

PATIENT: No.

DR. WALTERS: What can't you eat?

PATIENT: Fatty foods and starch.

DR. WALTERS: Can you eat raw apples without experiencing pain?

PATIENT: No, I don't eat apples.

DR. WALTERS: Cabbage?

PATIENT: No.

DR. WALTERS: Onions?

PATIENT: No.

DR. WALTERS: Does the urine or the stool change in color when you have the pain?

PATIENT: Yes, sometimes the stool changes.

DR. WALTERS: What color is it?

PATIENT: Light yellow.

DR. WALTERS: Does it seem to have little frothy bubbles in it at any time?

PATIENT: No, I don't think so.

DR. WALTERS: There are three things about pancreatitis that are worth knowing. First of all, in the acute phase the patient is sicker than if he has acute cholecystitis. Secondly, the attacks of pain, instead of lasting for a few hours, as in cholecystitis, sometimes last for days in pancreatitis. Usually the patient with pancreatitis is exquisitely tender to pressure in the epigastrium and has a lemon yellow tinge to the skin, and in the cases of acute pancreatitis there is an increase in the serum amylase and serum lipase. The serum amylase continues elevated for several days, usually reaching a value as high as 300 or 400, and I have seen some cases in which it reached a value of 1,000 units.

Chronic pancreatitis is something else again. The diagnosis of chronic pancreatitis in a young girl like this is certain and easy in the light of the excellent study which Dr. McNally presented to you and in the presence of roentgenograms showing the calcification in the vicinity of the head of the pancreas. Sometimes the calcification is not present, however.

The cholecystogram helps one to distinguish between the attack due to cholecystitis and the one due to pancreatitis, although occasionally they may be associated. In point of fact, a recently reported study by my colleagues, Dr. Comfort, Dr. Gambill, and Dr. Baggenstoss, of 29 patients who had pancreatitis without cholecystitis and an equal number, approximately, who had pancreatitis with cholecystitis, disclosed many similarities and remarkably few dissimilarities. The anatomic and histopathologic features are essentially the same with interstitial fibrosis, necrosis, cyst and abscess formation, and deposition of calcium occurring in both. It involves males of all ages more frequently than females, and alcohol is one of the etiologic factors.

In chronic pancreatitis without calcification, how can a diagnosis be made? First of all, it is always important to exclude the possibility of an associated cholecystitis or, if the gallbladder has been removed, of a stone in the common duct that is causing the pain, even though the patient is not jaundiced. One-third of all the patients that I have operated upon for stones in the common duct have never been jaundiced, and 2 out of 3 have never had chills and fever; that means that one-third of the patients in whom I have removed stones from the common duct have never had chills or fever or jaundice. Hence, stone in the common duct must be excluded in the patient who has symptoms suggesting pancreatitis.

When excluded, unfortunately, even though the choledochogram shows an absence of stones in the duct after that operation, the patient may continue to have attacks of pain. What is to be done for it? What is being done for this young lady? Restriction of fats and starches, a high-protein diet, and abstinence from alcohol are indicated. Recently Dr. Lundy and the neurosurgeons at the clinic have found that if the injection of dolamin solution into the splanchnic nerves reproduces the pain that the patient with pancreatitis or with cancer of the head of the pancreas has been experiencing, then resection of these splanchnic nerves affords relief of the pain in many of the cases. Too short a time has elapsed since this procedure has been done to determine the permanency of the result.

Prolonged external drainage of the common bile duct is frequently valuable in relieving the severe attacks of pain associated with recurring pancreatitis and so is internal drainage by means of an anastomosis between the common duct and the duodenum.

DIAGNOSTIC CLINIC

The Treatment of Hematologic Disorders

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THERE are four blood diseases for which new and important methods of treatment have recently been introduced. They are: (1) pernicious anemia, (2) Hodgkin's disease, (3) leukemia, and (4) polycythemia vera. It is my intention to discuss, first, the most effective forms of therapy for these various diseases as demonstrated by their effects on many patients over a long interval and, second, to comment on the possible advantages of the newer forms of treatment.

PERNICIOUS ANEMIA

Prior to 1926 pernicious anemia was regarded as a uniformly fatal disease. This was undoubtedly the correct view at that time, for it could not be demonstrated since the malady was first described that any treatment which had been introduced in the preceding seventy-seven years did actually prolong the life of a patient for a single day. Since then, with the evolution of treatment from the ingestion of a quarter of a pound of cooked liver five to seven times a week, to the present-day use of refined liver extract, ample opportunity has been afforded to evaluate and determine definitely the optimum therapeutic management of this disease.

With the proper use of modern antipernicious anemia medication it is now possible for such patients to live out their normal span of life. It is generally agreed that the most effective current treatment is the intramuscular injection of refined liver extract, 1 cc. (15 units), three times weekly until the red blood cell count is 3,000,000 per cubic millimeter. The dosage should then be reduced to 1 cc. (15 units) twice weekly, and continued in this amount until the red blood cell count is 4,500,000 per cubic millimeter for women, and 5,000,000 per cubic millimeter for men. Following this, a maintenance dose of 1 cc. (15 units) should be given intramuscularly every two weeks, or 2 cc. (30 units) once a month.

This dosage should be doubled when there is a progression in the neurologic manifestations, or a persistence of the glossitis. Furthermore, if at any time an infection develops, even such a minor one as an ordinary "cold," the dose likewise should be doubled as long as the infection persists. There is evidence also that in elderly patients, a larger dose of liver extract is sometimes necessary, and hence it may be advisable to increase the standard dosage in such patients 50 to 100 per cent.

There is no convincing proof that any additional treatment is ordinarily necessary in patients with this disorder. Hence the routine use of crude liver extracts, vitamins of various sorts, dilute hydrochloric acid, or other possible adjuvants is not indicated. The main principles in the guidance of therapy are: (1) be certain that the patient has pernicious anemia, (2) administer an adequate amount of a refined and potent liver extract in order to maintain the red blood cell count well within the limits of normal.

In a few patients, the regularly observed transient lag of the hemoglobin behind the increase in the red blood cell count will persist for an undue time. If this is true, one would suspect that the

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patient has a chronic loss of blood, usually due to bleeding from the gastrointestinal tract or the uterus. Search should be made and the complication, if discovered, treated in accordance with its nature. In addition, it may be indicated to administer iron in the form of 0.3 to 0.6 gm. of ferrous sulfate t.i.d., before meals.

Another form of therapy which is sometimes indicated is the use of blood transfusions in an emergency. This may occur when a patient is seen for the first time with a severe anemia which may possibly prove fatal before the two or three days elapse prior to the time when the antipernicious anemia medication becomes effective. Such patients should be given 500 to 800 cc. of blood, and this should be repeated within twenty-four hours, or even sooner if the need warrants it. The only other therapeutic agent to consider is the administration of 1 cc. of crystacillin (300,000 units) to combat the lethal effect of a complicating infection such as pneumonia. We must take into account the occasional development of such a condition, due to a reduced resistance of a patient with a severe anemia.

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FOLIC ACID

Since the introduction of folic acid as a therapeutic agent in patients with pernicious anemia,[1] a sufficient number have been treated with this preparation to permit definite conclusions concerning its therapeutic efficacy. In the first place, it has absolutely no effect in any type of anemia except a macrocytic anemia with a megaloblastic bone marrow. This includes pernicious anemia; the anemia in a great majority of patients with sprue; the anemia observed following total gastrectomy, intestinal anastomoses, and intestinal stenosis; the macrocytic anemia of pregnancy; the anemia associated with dietary deficiencies as "exogenous" pernicious anemia, pellagra; tropical anemia; the megaloblastic anemia of infancy; and the anemia due to fish tapeworm infestation. The macrocytic anemia sometimes observed in widespread liver disease is not ordinarily associated with a megaloblastic bone marrow.

Also, the following statement appears to have been established beyond the question of a doubt. While it is highly effective in the treatment of the anemia of true addisonian pernicious anemia, *it does not control the neurologic manifestations of this disorder*. In fact, there are some who believe that folic acid actually accelerates the progression of the lesions in the nervous system. It is my advice, therefore, that folic acid be employed only in the macrocytic anemias with a megaloblastic bone marrow *in which there are no neurologic complications*. Its possible ill effects on the nervous system in patients with pernicious anemia contraindicate its use even when given in combination with liver extract. This would exclude only true addisonian pernicious anemia, and permit the use of the antianemia substance in all of the other types listed. It has two great advantages, namely (1) it is potent when taken orally, and (2) it can be given to patients who have become allergic to liver extract.

The dose of folic acid is 10 to 15 mg. daily, either orally or intramuscularly, until the blood is normal, and then 5 to 10 mg. daily as a maintenance dose.[2]

VITAMIN B_{12}

A new factor (LLD) discovered by Shorb[2] to be essential for the growth of the Lactobacillus lactis Dorner, was also found by this observer to

parallel the degree of potency of various types of liver extracts employed in the treatment of patients with pernicious anemia. This led to the successful therapeutic trial of this substance, subsequently designated as vitamin B_{12}, in patients with pernicious anemia.[3] It has been observed that when one gamma (1/65,000 gr.) of this material is given daily by intramuscular injection, the blood values are completely restored to normal within six to eight weeks, following an immediate preliminary reticulocyte rise of the standard type. In other words, here is a new substance, isolated from liver, which in almost unbelievably small amounts will produce all of the effects first observed following the ingestion of one-quarter to one-half pound of liver daily.

Further study by Rickes and his associates[4] has shown that it is a reddish-blue crystalline substance containing cobalt. Although definite proof is lacking, it is logical to assume for the present that this substance is probably the active antipernicious anemia principle of liver. Additional studies[5] have shown that it is effective in arresting the progress of the nervous system involvement, and that it controls the lesions of the mucous membranes in pernicious anemia.[6]

In other words B_{12}, as far as preliminary observations go, is a complete treatment of pernicious anemia. In a patient who was sensitive to liver extract, the administration of B_{12} was effective and could be given without producing untoward allergic manifestations.[5] One patient with a macrocytic anemia of pregnancy did not improve following its use.[7]

At the Simpson Memorial Institute we have treated 6 patients with pernicious anemia by means of this new preparation with satisfactory results. In 2 of these patients the dose was reduced to 0.45 gamma daily (1/130,000 gr.) and a definite although substandard effect was produced. This material has been isolated apparently in pure crystalline form. Its complete chemical nature and method of synthesis are as yet unreported. Furthermore, no publications have appeared concerning its efficacy by mouth. In my own opinion, however, it does not seem rash to predict that in the not too far distant future this material will be made synthetically and will be available commercially for oral use.

Recently Rickes and his associates[8] have demonstrated that the culture broths of *Streptomyces griseus* yield a red crystalline compound which is potent in the treatment of pernicious anemia. Furthermore, all comparative tests indicate that this substance, obtained from a microbiological source, and vitamin B_{12} are identical. It is possible that B_{12}, therefore, may be produced in sufficient quantities by this method to make it feasible to employ it in the routine treatment of pernicious anemia and other macrocytic anemias which may be benefited by it.

HODGKIN'S DISEASE

This condition, which is usually assumed to be due to a malignant process, is best treated by the roentgen ray applied locally. After a considerable number of years of trial with this form of therapy, those with the largest experience believe that many of the patients will be restored for a variable but well worth while temporary period of good health, and in individual cases it undoubtedly prolongs life.

The problem in the treatment of Hodgkin's disease has always been that the patient invariably reaches a stage when roentgen ray therapy is no longer effective. At this time the patient's condition is usually characterized by emaciation, fever, and the development of a moderate to profound anemia. Recent experience has shown that nitrogen mustard therapy when then given will result in a remission. This is characterized by a subsidence of fever, a regression of the lymphadenopathy, hepatomegaly, splenomegaly, the cutaneous manifestations, and an amelioration in the patient's symptoms. In my experience, such periods of improvement persist from a month to a period of eight to ten months, and occasionally longer. It is not possible in any given patient, however, to predict with certainty the duration of such results.

Of greatest importance is the *possibility* that in some patients, at least, when they become refractory to the x-ray, nitrogen mustard therapy may resensitize them to further roentgen ray irradiation. Additional observations must be made, however, before a more exact statement concerning this can be formulated. Experimental studies suggest[3] also that consideration be given to the plan that the disease be first treated with nitrogen mustard therapy and when the patient becomes refractory to this agent, then roentgen irradiation may be employed. Any statement concerning the effectiveness of such a program of treatment must await further studies.

From our present experience it seems safe to conclude the following: (1) If nitrogen mustard therapy is withheld in patients with the disease who have become refractory to roentgen irradiation, then the physician is depriving such patients of a valuable therapeutic agent, even though the benefit derived from it is only transient. (2) It is of use in the occasional patient with Hodgkin's disease in whom intensive roentgen therapy must be directed to the mediastinum, and consequently fibrosis of the lungs may develop. This, of course, may be avoided by means of nitrogen mustard therapy. (3) The fact that chemotherapy of this type has even a transient salutary effect, reopens for consideration the entire field of the treatment of the malignant lymphomas. If such a chemical can be produced which has as much effect as the nitrogen mustards now in use, then the possibility is great that improved and more beneficial compounds of a similar nature may be synthesized.

The drug is given intravenously in distilled water in a dosage of 0.1 mg. per kilogram of body weight. This dose is injected every other day for four days but in no instance is the total dosage for the four injections permitted to exceed 24 mg. The original preparations caused considerable nausea and vomiting but the new nitrogen mustard derivative, S-K 136, although it may cause anorexia for twelve to eighteen hours, does not result in other gastrointestinal disturbances. It is, however, similar to other preparations in that it is prone to cause venous thromboses at the site of the venipuncture. This can be averted by injecting the material into the rubber tubing leading to the vein from the intravenous apparatus.

The nitrogen mustards find their greatest usefulness in the treatment of Hodgkin's disease. They have been employed therapeutically with some success in chronic lymphatic and myelogenous leukemia, in polycythemia vera, and in lymphosarcoma. The results attained are not as satisfactory, however, as those produced by irradiation. This form of therapy is of no value in the treatment of the acute leukemias.

TREATMENT OF LEUKEMIA

It is generally agreed that roentgen irradiation is the treatment of choice in all types of leukemia. It is of value, however, in the treatment of the chronic types only, as it is not effective and, in fact, it may be harmful in the acute varieties. Roentgen irradiation is the preferred therapeutic agent in the leukemias because it is readily available, the dosage is more accurately controlled, and extended experience over the past few decades makes it possible to predict the results with greater certainty.

In the past, in my opinion, there has been a tendency to make two errors when roentgen irradiation is employed in the treatment of the disease. They are: (1) The relapse is permitted to proceed too far before treatment is administered, and (2) excessive irradiation may be given which may not only depress the abnormal formation of the white blood cells but also do injury to the red blood cell forming elements. It is probably not wise to permit the white blood cell count to rise above 40,000 per cubic millimeter without applying treatment, and it should be given before this level is reached, if symptoms appear. There is general agreement that the "spray" or total body irradiation is superior in the treatment of patients with myelogenous leukemia, and the local treatment is more satisfactory in the patients with lymphatic leukemia.

RADIOACTIVE PHOSPHORUS

Radioactive phosphorus (P_{32}) has been employed in the treatment of chronic leukemia and is especially effective in patients with the myelogenous type. It is, in effect, another method of administering total body irradiation. While it can be given orally, it is probably more effective when injected intravenously as this assures complete absorption. When this form of therapy is used, the radioactive material is carried to the bones where the abnormal marrow is subjected to irradiation for a period of several months. The dose of radioactive phosphorus (P_{32}), which has a half-life of 14.3 days, is 4 to 6 millicuries. It may be repeated, if necessary, in the same dosage, but not before a period of four months has elapsed.

The results produced are similar to those following the x-ray treatments. There is no special advantage to radioactive phosphorus, however, except that the material is easily given and there is a complete absence of radiation sickness. On the other hand, it does require certain apparatus and experienced workers to handle it. Unless an efficient and practical method of dispensing the material is devised and put into effect, it will not be possible to treat a large number of patients with leukemia by this method. It should be empha-

sized, however, that the physician is *not* depriving his patient with leukemia of a form of therapy which is distinctly more efficacious than the roentgen irradiation, if radioactive phosphorus is not administered.

URETHANE IN THE TREATMENT OF LEUKEMIA

Urethane (ethyl carbamate) was introduced in the treatment of chronic leukemia by Paterson and her associates[9] in 1946. From the preliminary studies, it was concluded that this drug produced an effect comparable to the x-ray. Although the exact mode of action is not clearly understood, it is believed that the effect is produced by inhibiting the rate of mitotic cell division of the leukemia cells.

Our experience in treating a group of patients with chronic leukemia, especially the myelogenous variety, has been gratifying. Our plan of therapy has been as follows: 0.32 gm. (5 gr.) of urethane in enteric-coated tablets has been used. The first day of treatment this dose is given three times. On successive days the dose is increased to a total of 4, 5, 6, 7, 8, and 9 such tablets daily, or a maximum total dosage of 3.0 gm. (45 gr.) a day, provided the patient can tolerate this amount. If this dose can be taken, it should be continued until the white blood cell count is within normal limits. In some patients, however, the development of gastrointestinal symptoms prevents the ingestion of the maximum dosage and hence it becomes necessary to employ the maximum dosage tolerated which does not produce nausea and vomiting. In some instances the patient tolerates the medication better if it is given during or after meals.

It has been our custom to continue with a dose of 1.0 gm. indefinitely unless the white blood cell count falls to an extremely low level. In general, it may be said that with this medication it requires between fifteen and ninety days, with an average of about twenty-one days, for the white blood cell count to return to normal. The leukocyte count should be determined every two to three weeks in order to control the treatment.

It is not possible from our present experience to draw a final conclusion concerning the value of urethane in the treatment of leukemia. The results appear to be more satisfactory in myelogenous leukemia than in other varieties. It is a simple therapeutic measure which can be easily employed, but *it does require that the patient continue under observation and the leukocyte count be determined at intervals*. In a majority of our patients with chronic myelogenous leukemia, gratifying results were attained. With our present experience, it is not possible to state the average duration of the remission induced by the therapy. In one of our patients it has persisted for over one year. The treatment does not appear to be of benefit in patients with acute leukemia, although in some instances the total white blood cell count is reduced.

FOLIC ACID ANTAGONISTS

Recently several compounds, closely related chemically to folic acid, have been developed which have the property of inhibiting its growth-promoting activities toward certain bacteria by interference with enzyme systems. These substances, on account of this peculiar characteristic, are called "folic acid antagonists" or "inhibitors." The use of this unique property of the antagonists in the treatment of patients with leukemia was first employed by Farber and his associates in 1948.[10] Following this report Bethell and his coworkers[11] treated a group of patients with leukemia and related disorders with aminopterin, which is a folic acid inhibitor.

It has been clearly established that in patients with myelogenous leukemia, aminopterin will usually cause a striking decrease in the granulocyte count of the peripheral blood and inhibit the myeloid activity in the bone marrow. With this there is often a notable decrease in the size of the spleen, and amelioration of the symptoms. When the antagonists are omitted in such patients, there is a rapid recurrence of the leukemic process with the associated symptoms. In one patient, Bethell and his associates[11] were able to reverse the action of the antagonist by the administration of large doses of folic acid.

The observations of the action of folic acid antagonists in patients with leukemia may be[5] summarized by the following statement. In patients with acute leukemia there appears to be a "wiping out" of the marrow components with the main effect on the immature cells of the granulocyte series. The change appears to be one which tends to convert the condition to an aplastic anemia. The effect of the antagonists is not entirely beneficial, as some patients develop an alopecia, ulcerative lesions in the mouth, and prolonged use

causes a depression in the formation of the erythrocytes. The possibility that some of these changes may be the result of the action of the antagonists on the other components of the vitamin B complex should be taken into consideration.

At present, it is recognized that aminopterin definitely does not alter the course of patients with leukemia although promising results have been reported in children with the acute form of the disease. With the likely possibility that newer compounds may be produced, it is reasonable to assume that in the future more potent compounds with less harmful untoward effects may be developed which will be much more effective agents in the treatment of the disease.

PARA-AMINOBENZOIC ACID IN THE TREATMENT OF LEUKEMIA

It is of interest to note the studies of Zarafonetis and his associates[12] which show that para-aminobenzoic acid will consistently reduce the white blood cell count in patients with chronic myelogenous leukemia. When this preparation was administered orally in the form of 2 gm. of sodium para-aminobenzoate every two hours there was a striking reduction in the total white blood cell count which was usually first apparent during the third week of therapy. With the discontinuance of the medication, there was a rapid rise in the leukocyte count which was again reduced by the resumption of therapy. Despite the remarkable reduction of the total white blood cell count, there was no uniform or substantial clinical improvement in the condition of the patient or diminution of the symptoms.

The mechanism whereby para-aminobenzoic acid causes this reduction in white blood cell count is not clear at present. It is apparent, however, that the effect is merely one in which the factors responsible for this persistent elevation are merely inhibited. This is indicated by the prompt rise which occurs when the therapy is omitted.

The action of this substance in patients with myelogenous leukemia is of no practical value at present in the management of the disease. It is of importance, however, because continued studies may disclose new and significant information which will have a bearing on the disordered metabolism of leukemic cells and possibly other cells of a neoplastic nature.

POLYCYTHEMIA

The most commonly accepted current view concerning the etiology of polycythemia vera is that it is due to an excessive production of red blood cells attributable to an overactive bone marrow. The exact cause of the abnormality in bone marrow function is a debatable one but my own personal belief is that the condition is closely allied to leukemia and is, therefore, of a neoplastic nature.

THERE are three useful therapeutic procedures which may be employed in the treatment of patients with this disorder. They are: (1) phlebotomy, (2) total body irradiation, and (3) use of radioactive phosphorus.

Phlebotomy with the removal of 300 to 500 cc. every third day is useful in the treatment of patients who are suffering from the acute symptoms of the disease. It is often necessary that a total amount of 1,500 cc. or more be taken in order to reduce the hematocrit reading to 50 per cent, which is the desirable level to which it should be reduced.

In recent years it has been demonstrated that the roentgen treatment with total body irradiation is probably the most convenient as well as a highly effective method of therapeutic management of the disease. An average dose of 20 roentgens is given by the "spray" technic every other day until the white blood cell count is 4,000 per cubic millimeter. This usually requires a total dosage of between 100 and several hundred roentgens. In a great majority of patients, a remission is produced by this form of therapy which persists for periods of six months to several years.

Radioactive elements (P_{32}) may be employed in the treatment of polycythemia vera with satisfactory but not superior results to those attained by roentgen irradiation. This form of treatment is merely another method of giving total body irradiation. This radioactive material has a half-life of 14.3 days. It may be given orally or preferably intravenously, and since it concentrates in the bone marrow, it can subject this tissue to irradiation for a prolonged period of time.

We have found it safest to begin with a dose of 4 to 6 millicuries and not to repeat it for a period of about four months. While the effect of this agent on the white blood cells is an immediate one, that is within a few days, it requires from two to three months to produce an appreciable reduction in the hemoglobin and red blood cell count. It is

advisable, therefore, when treating with either "spray" roentgen ray or with radioactive phosphorus to first use phlebotomy for the relief of the immediate symptoms.

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AUREOMYCIN FOR TYPHUS

Aureomycin therapy has produced good results in a case of recurrent epidemic typhus, according to a report by Dr. Emanuel B. Schoenbach, Johns Hopkins University School of Medicine. Administration of the antibiotic was started on the sixth day of illness, when the patient's temperature was 103.6° F. Quick improvement resulted. Headache was diminished in twelve hours, fever was abated in twenty-four hours, and rash had almost disappeared in forty-eight hours. Six days after the aureomycin treatment was begun, the patient was discharged from the hospital with no symptoms of the disease. In contrast, among 18 patients observed during the past ten years, fever was abated on the tenth to the sixteenth day of illness.

THE PROGRESS OF MEDICINE

Mural depicting the five main ages of man (Primitive, Greek, Dark Ages, Renaissance, and Modern) and his progress in the treatment of disease from primitive magic to the approach of modern science. This seven-foot panel will be shown at several medical conventions during the coming months by Burroughs Wellcome & Co.

DIAGNOSTIC CLINIC

Diagnosis and Treatment of Gallbladder Disease

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GALLBLADDER disease is a large subject and there are many varied aspects which are available for discussion. I will try to pick out some of the things which I believe are important and of particular interest to you.

First, I want to call your attention to the extreme frequency of gallbladder disease. One of the best records which shows this frequency is a large series of autopsies, about 17,000 cases, reported by Robertson and Dochet of the Mayo Clinic. In this report they noted that 32 per cent of the women past the age of 40 had stones. Of course, there are a lot more who had gallbladder disease without stones, but I would like to point out that I am sure that of this 32 per cent, much less than one-third had symptoms which you could identify specifically as being of gallbladder origin.

The disease is much less common in men; in fact, Robertson and Dochet found when they combined men and women in their series, they had only 22 per cent incidence of stones in patients past the age of 40.

The symptoms and manifestations are well known, and I will not go over them except to emphasize one or two points. First, the pain is a very important phase of the diagnosis. The dyspepsia so commonly seen in gallbladder disease is likewise commonly seen in dozens of other diseases of the organs in the peritoneal cavity, and we cannot use that as a very significant indication of the presence of gallbladder disease.

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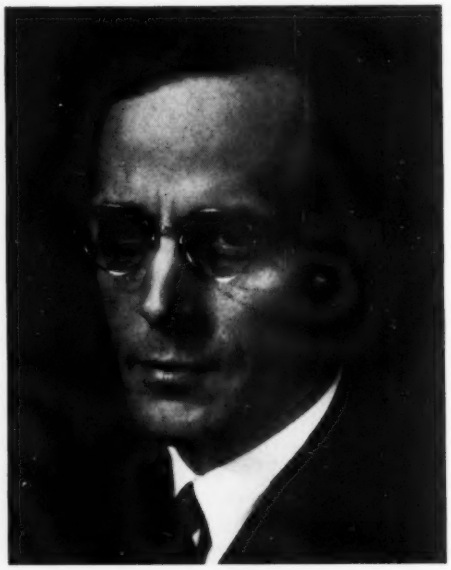
If you operate on patients with stones or gallbladder disease in the absence of pain, you can expect a large percentage of failures in your postoperative results. As a matter of fact, if you have no pain typical of a gallbladder right upper quadrant pain, your incidence of good results will be no more than 60 per cent; if you have rather typical attacks of pain in the right upper quadrant radiating posteriorly and stones present in the gallbladder, you can depend upon 95 per cent good results in that series.

DIFFERENTIAL DIAGNOSIS

In one case, the patient had rather typical upper quadrant pain. She was sent into the hospital without a cholecystogram. While in the hospital, a cholecystogram was done, and to everybody's surprise there was a highly concentrating gallbladder. Of course, that aroused everyone's suspicion that the diagnosis was in error. The radiologist, being astute, saw something wrong in the vertebral column and took a better film; he found that one vertebra was necrotic. The diagnosis was rather obvious—tuberculosis of the spine.

This is only one of about a dozen or more diseases which can mimic exactly gallbladder disease; there are not very many diseases where errors are made more frequently than in gallbladder disease. This is particularly true because gallstones and cholecystitis are so common that the clinician is apt to say, "Well, I find some stones so we must operate and get rid of these symptoms of dyspepsia," but perhaps the patient had an arthritis of the spine or a carcinoma of the colon or some other



WARREN H. COLE

disease, which, of course, is not relieved by cholecystectomy; obviously, performance of cholecystectomy under such circumstances would be a very serious error.

TABLE 1

INDICATIONS FOR OPERATION IN GALLBLADDER DISEASE

1. Cholecystitis or cholelithiasis with symptoms
2. Cholelithiasis without symptoms:
If under 45 or 50 years of age
3. Secondary disease in other organs:
Hepatitis
Pancreatitis
Duodenal adhesions producing obstruction, etc.
4. Obstruction of cystic or common duct
5. Tumor
6. Trauma
7. Miscellaneous causes:
Fistula
Stricture
Congenital atresia

INDICATIONS FOR OPERATION

What are our indications for operation in gallbladder disease? In the first place, we must have cholecystitis or stones with symptoms; at least that is one indication (Table 1). If you have stones without symptoms and the patient is under 45 or 50 years of age, you are entirely justified, in my opinion, in advising operation, because if that patient carries stones throughout life expectancy, meaning another twenty years, the danger of some complication is very significant. And remember, it is the complication of gallbladder disease which is the lethal factor and not gallbladder disease itself.

If secondary disease in other organs is present, such as hepatitis, pancreatitis, adhesions around the duodenum producing obstruction, again we have a strong indication for surgical treatment, even though the patient is considerably past the age of 45 or 50. Also if the cystic duct becomes obstructed by stone or by inflammatory adhesions or if the stone drops in the common duct, again you have very strong indications for operation and you can justifiably insist upon surgical relief in those patients.

Tumor is an indication if you can make the diagnosis. How often can we make a preoperative diagnosis correctly of tumor in a gallbladder? Occasionally you do see papillomas showing up as defects. Very seldom indeed can you make a diagnosis of carcinoma of the gallbladder, because the function of the gallbladder becomes destroyed early in the disease, and perhaps it was already destroyed because stones are usually present in carcinoma of the gallbladder. Accordingly the gallbladder will not concentrate the dye and the tumor cannot be demonstrated as a filling defect, as is the case with stones.

Trauma, of course, is a justifiable indication. In addition, there are miscellaneous causes such as fistulas, strictures, atresia, and so forth.

In Figure 1 are shown two gallbladders which illustrate two points: They were removed within a few days of each other, one being about the largest I had ever seen, the other the smallest. There was a little thickening of the dome in the large gallbladder; that is all there was abnormal in that gallbladder. The patient's symptoms were typical of gallbladder disease with stones. She returned six months later with a mass in the right upper quadrant; was operated a second time and a carcinoma was found. Originally the surgical pathologist's section came back as cholecystitis, but when we looked again we found a few cells which were rather obviously carcinoma, and after cutting

Figure 1. The gallbladder in the upper part of the illustration was unusually large. It was removed from a patient with rather typical gallbladder colic. The thickened area in the dome is an early carcinoma. In spite of the fact that this tumor was presumably very early, metastases developed and the patient died about one year later. The gallbladder in the lower part of the illustration was unusually small and removed from a girl 16 years of age.

more sections we found a definite, small, early carcinoma. This patient, however, went on downhill, in spite of the fact that we removed this nodular mass from the edge of the liver, and she died a year later.

The small gallbladder was removed from a young lady 16 years old. She had several attacks of appendicitis of a mild type, and appendectomy was done between attacks, and this was found. This gallbladder was removed, and I say very justifiably, although there were no symptoms referable to gallbladder disease.

CASE PRESENTATIONS

I wish to present two patients who will bring out several points of considerable importance. The first one is a lady 52 years old. She has attacks of pain and colic in the right upper quadrant. Past history: usual diseases of childhood. In 1925 she had a cervical polyp removed which proved to be malignant. This was followed by hysterectomy. There have been no indications of recurrence since. The menstrual history began in 1919. She is the mother of 4 children. She has, of course, surgical menopause. There is nothing of importance in her family history. In January of 1948 the patient had the first of several attacks of pain in the right upper quadrant. They were brought on by the ingestion of pork, and consisted of rather sudden, severe pain in the right upper quadrant referred to the right shoulder. The attacks were quite severe

and the patient assumed the position of leaning over the back of a straight chair in an attempt to relieve the pain. Following the attack there was no jaundice and the stools were cholic. X-ray examination was made between attacks and a functioning gallbladder was found, with several large stones. These four shadows inside the gallbladder, which has fair concentration, show up very decisively and the diagnosis of cholelithiasis cannot be in error.

What is the cause of her pain? In the first place, it is not a diseased gallbladder in the ordinary sense of the word. If you looked at the gallbladder grossly it would appear practically normal. The wall would be thin and you would have no inflammatory disease. If one of these large stones were to drop down into the ampulla of the gallbladder, that is near the cystic duct, it might obstruct the cystic duct, and you would then have pain produced by obstruction. We are convinced that obstruction of the cystic duct is one of the major factors in the production of pain, but of course not the only one.

I would not expect anything in her common duct, for two reasons: she has had no history of jaundice, and these stones are large—too large to drop down through the cystic duct.

WHAT should we tell this patient? Assuming that all of her other data are negative, the blood pressure, urine, and so on, we would recommend operation for two reasons: first, she has had several mild attacks of pain; second, she has stones. It is true that she might say these attacks of pain are not so severe but that she can tolerate them, and nobody can predict just when she will have another attack.

We would say also that you might have some slight danger of development of carcinoma in a patient carrying stones around for twenty, twenty-five, or thirty years. We do not know when those stones developed, but if she lives her normal life expectancy she has approximately seventeen more years. If you will go over the series of reports in the literature you will find that now there is agreement that there is carcinoma in about 4 per cent of proved cases of stones, at least as found at autopsy. So 1 out of 20 patients with stones at autopsy also has carcinoma of the gallbladder. When you apply those figures you begin to get a little worried, because carcinoma of the gallbladder is a vicious tumor for which there is no satisfactory treatment, at least with expectation of cure.

Now that we know that the mortality rate following cholecystectomy in a simple case like this is under 1 per cent, we are really, then, weighing 1 per cent versus 4 per cent, and the scale tips rather heavily toward the side of cholecystectomy, assuming, of course, that the patient has several more years to live. If, however, she were 65 years old, had a blood pressure of 200, and a lot of albumin in the urine, I would say let this patient alone and take the risk of carcinoma or obstruction of the common duct, because we do not want to run the risk of fatality following an operation in the presence of hypertension. Obviously a patient with hypertension and severe kidney damage is endangered a great deal by cholecystectomy. The mortality rate would be as high as 10 per cent, perhaps higher, in that group. Your mortality rate from operation would be greater than the incidence of carcinoma or any of the complications of gallbladder disease.

This patient is not very anxious to have an operation. What danger is there if she delays or refuses? I have already discussed some of the dangers. There is not a great deal of danger of her getting a hydrops and empyema at the present time, although one of those large stones could drop down and obstruct. So that all we can say is that we advise operation; we rather insist that she have it, but we cannot tell her it is absolutely essential, as we can perhaps in the next patient.

This next patient is 46 years of age and was admitted to the hospital on October 27, 1948, with a history of severe right upper quadrant pain which was sudden in onset following the eating of chicken ten days prior to admission. This was accompanied by marked nausea, anorexia, and vomiting. The pain was colicky in nature, did not radiate, but continued for one week, with nausea and vomiting.

DR. COLE: Tell us how bad that pain was.

PATIENT: It was very bad.

DR. COLE: Did you have to have some medicine for it?

PATIENT: I had to have the doctor. He made an injection.

DR. COLE: Did that relieve you?

PATIENT: Oh, yes. Then he gave me a brown tablet to use, and the pain went then.

DR. COLE: But if you had not had the medicine would the pain have been unbearable?

Figure 2. Patient had jaundice of varying intensity for a period of three years. A stone was found in the common duct. (From Cole in *Illinois M. J.*).

PATIENT: It was an awful pain, awful pain! I was vomiting all the time, too, because of pain.

DR. COLE: Thank you very much. She had a rather typical attack of gallbladder disease of a severe character, which gives still more assurance that the trouble is arising from the gallbladder.

This patient noted chalky stools; in reality we should say light tan, of about one week's duration. The urine was dark in color during that time. She did not think she had any fever.

During the few days prior to admission she has had severe pruritus, and that has troubled her a great deal. But she did not notice jaundice, although she said her eyes were slightly icteric, that is, they were a little bit yellow. There is no history of hematemesis or melena. There is a history of marked aversion to fatty food.

The patient thinks she had a similar attack last year and one seven years prior to admission.

The physical examination is negative except for a slight icteric tinge to the sclera. The laboratory examination shows 8,000 white cells; the differential is normal; there is an icterus index of 12; urine is negative. An icterus index of 12 is on the borderline and certainly is not indicative of gross jaundice; you have to call that latent jaundice.

The x-rays reveal no shadow, which is just as conclusive from the standpoint of diagnosis as if we saw stones, because when the cholecystogram shows no shadow you have 100 per cent assurance that there is gallbladder disease, particularly if you can prove that the patient got the dye and did not vomit it, and if she had a double dose, which this patient had.

The next day, after one visualization attempt, she had a double dose of dye, and this likewise showed nonvisualization, so we know with no chance of error that this patient has a diseased gallbladder; in fact, it is diseased so much that it is thrown out of function.

What would be the advice here? In the first place, her examination now reveals only slight tenderness in the right upper quadrant, although when she had her attack she complained that the

pain was present in the epigastrium and, in fact, slightly to the left.

Is this pain solely of gallbladder origin? That is a hard question to answer. In reality I think that in many of these patients the pain is also of pancreatic origin. In other words, there is a pancreatitis very commonly associated with gallbladder disease, particularly when stones are present.

I would predict that about 75 per cent of patients with pancreatitis also have gallbladder disease, and those figures represent justification for advising surgical treatment of gallbladder disease when you have a pancreatitis, even though you may have no symptoms of cholecystitis. Keep that point in mind. If you have pancreatitis and a diseased gallbladder, I think, barring exceptional cases, you have perfect justification for removing the gallbladder, because pancreatitis is a severe disease which has devastating effects; it tends to be recurrent, and it is a distinct threat to life.

This patient may have complication of slight degree which would be added reason for advising operation. Of more importance than that is the fact that she has had slight icterus with severe itching.

We might ask, could this mild jaundice be associated with hepatitis? We know that hepatitis is a very common accompaniment of gallbladder disease. But my answer to that in this case is no. I do not think that hepatitis is the cause of her jaundice, because she had no fever or evidence of acute inflammation accompanying her attack. If she had had fever of 103° F. with a lot of tenderness and muscle spasm and other evidences of chemical or bacterial inflammation, I would then say that she might have had enough hepatitis to produce slight jaundice.

WHAT is our advice to this patient? It is very strongly in favor of surgical treatment. In the first place, I am quite convinced that she has or had a stone in her common duct. We do know that small stones can get into the common duct or can arise there and be passed through the sphincter of Oddi. Most of them are not passed. They may lodge in the sphincter for a few days and then drop back, as I would conclude happened in this case—a stone lodged against the sphincter producing probably a partial obstruction, and now it has dropped back out of position so that she has no symptoms and no evidence of jaundice.

I would likewise say that she should have her common duct opened, even though you cannot feel a stone. There might be an exception to that. For example, if you looked at this common duct and saw a duct of normal size and with normal wall without thickening, I would say perhaps that the stone had passed on out. I cannot give you at this time a definite statement as to what I would do if that picture presented. I would want to see that patient and would want to be there and go over those data myself, but I have on one or two occasions failed to open the common duct, and as far as I know I have never regretted that, even though there was a history of jaundice.

Commonly, when you have a history of jaundice it will be due to other things, at least possibly due to other diseases. The most common explanation of jaundice is not obstruction of the common duct by stone, but virus hepatitis. If the patient presents herself with a mild pain in the right upper quadrant, a history of having had jaundice of two or three weeks' duration, perhaps six months previously, and had no pain at that time, the diagnosis is in reality a virus hepatitis and not obstruction of the common duct by stone. Operation in that case might be a serious error, even though that gallbladder revealed no shadow. The whole difficulty may have been caused by a virus hepatitis and not primarily by the gallbladder.

Still another patient illustrates a very important point (Figure 2): She had jaundice for three years off and on. At first we thought she had a carcinoma of the pancreas, but the fact that she had slight alternation of her jaundice with cholic stools now and then made us suspect that that diagnosis was wrong and we thought she deserved a laparotomy. At laparotomy we found the duodenum plastered against the gallbladder. There was a fistula between these two organs. Obviously some stones had eroded through into the duodenum. The gallbladder was nothing but a fibrosed nubbin. We found a large stone in the common duct. We opened the duct, took out the stone, put in a T-tube, and she got well. What a tragedy it would have been if we had sent her home with a diagnosis of inoperable carcinoma.

Sometimes you cannot get those stones out through the opening in the common duct, but must open the duodenum and perhaps dilate the sphincter and remove the stones manually, closing the duodenum in a transverse fashion.

I have already referred to the indications for opening the common duct. Of course they are very

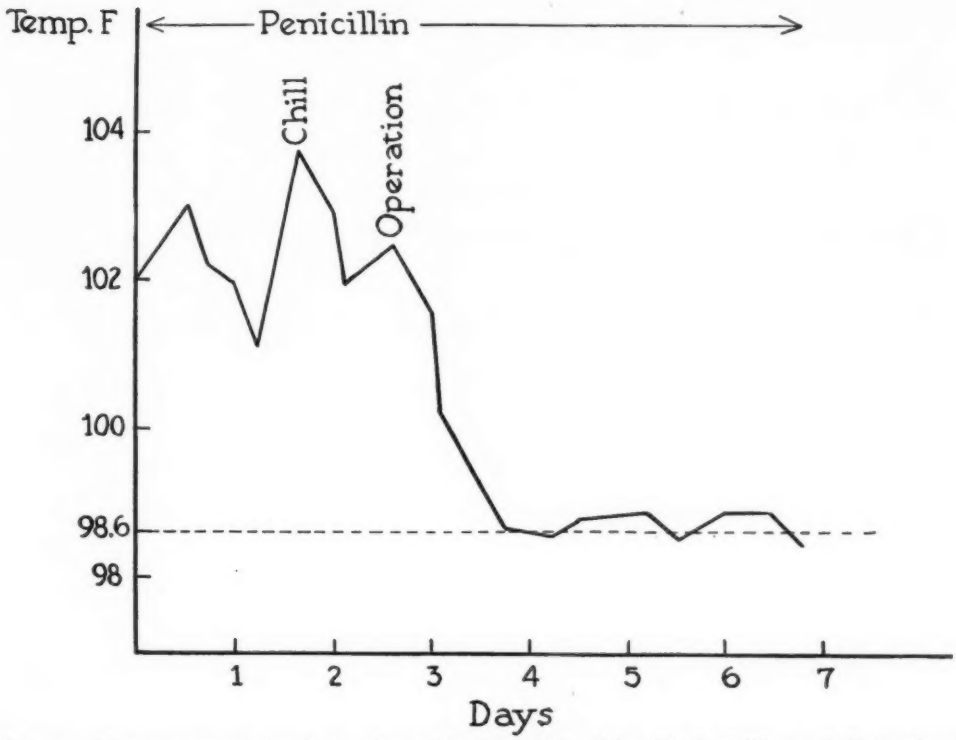


Figure 3. Temperature reaction in a patient with suppurative cholangitis. Penicillin was ineffective in relieving the chills and fever but drainage of the common duct resulted in almost immediate subsidence.

TABLE 2

INDICATIONS FOR OPENING COMMON DUCT

1. Palpable stone or tumor in duct
2. Dilated duct
3. Thick wall
4. Jaundice at time of operation
   (History of jaundice not sufficient indication unless virus hepatitis can be excluded)

important, if you have a palpable stone or if you have a dilated duct or thickened wall, or jaundice at the time of operation (Table 2). A history of jaundice previously is not sufficient, particularly if you do not have pain with the jaundice.

The other patient with a stone in the common duct, as illustrated in Figure 2, did not have much pain; she was one of the exceptions. About 20 per cent of patients with obstruction by stone will not have pain except perhaps during the first day or two. Most of them will have slight pain at the onset. After that the pain disappears and they really have painless jaundice, and that can mislead you.

SUPPURATIVE CHOLANGITIS

A COMPLICATION which is of great importance, because you must use your judgment in treatment, is suppurative cholangitis. A patient had jaundice of about a week's duration, a fever of 102° F., and chills. I am now convinced that chemotherapy is of no value in suppurative cholangitis. However, streptomycin in one case really cured a situation which persisted after we had drained the common duct, and in that case I think she probably had small abscesses in the liver.

Figure 3 shows an unusually good response to drainage. The temperature, as you see, dropped precipitously to normal after the common duct was opened and drained. We do not expect quite as good a result in every case. We expect it to take a couple of days for the temperature to drop, but indeed the results of drainage of the common duct in suppurative cholangitis are remarkably good, and I am strongly in favor of drainage, although I know some physicians think they can treat it medically.

SCIENTIFIC EXHIBIT

The Therapeutic Uses of Penicillin Aerosol

The Application of Nebulized Penicillin and Other Aerosols in Broncho-Pulmonary Disease

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BIOLOGIC RATIONALE FOR PENICILLIN AND OTHER ANTIBIOTIC AEROSOLS

1. High local concentrations on the bronchopulmonary surface as demonstrated by the high sputum levels of the drug employed.
2. Simultaneous provision of effective blood levels.
3. Elimination of infection caused by relatively resistant organisms as in bronchiectasis, pneumonitis and lung abscess.
4. Provision of high local concentrations in the mucous membranes, such as those of the nasal accessory sinuses not accomplished by systemic penicillin.
5. Effectiveness and feasibility for long continued administration as in bronchiectasis.

DISEASES IN WHICH NEBULIZED PENICILLIN MAY HAVE THERAPEUTIC VALUE BEYOND THAT ACCOMPLISHED BY SYSTEMIC ADMINISTRATION

1. Sinusitis, acute and chronic.
2. Bronchiectasis.
3. Lung abscess.
4. Pneumonitis and bronchitis due to highly resistant organisms.

CLINICAL RESULTS WITH PENICILLIN AEROSOL IN BRONCHOPULMONARY AND SINUS DISEASE

Diagnosis	*No. Cases*	*Improvement Due to Penicillin Aerosol*		
		Marked	*Moderate*	*Slight or None*
Bronchiectasis	41			
Bilateral, advanced	34	9	13	12
Preoperative	3	2	1	0
Minimal	4	3	1	0
Lung Abscess, acute	5	3	0	2
Lung Abscess, chronic	3	1	0	2
Bronchitis, chronic	25	14	7	4
Sinusitis, acute	15	8	3	4
Sinusitis, chronic	105	29	40	36
Bronchial Asthma	91	16	19	56
Pulmonary Emphysema	86	20	19	47

METHOD OF TREATMENT

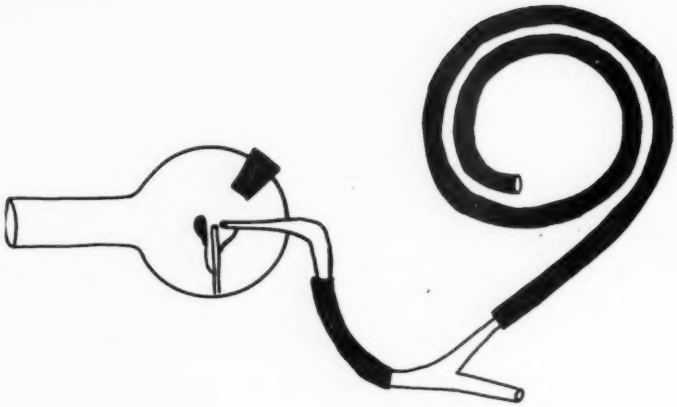
Bronchopulmonary Infections, Acute and Chronic Sinusitis

MOUTH INHALATION

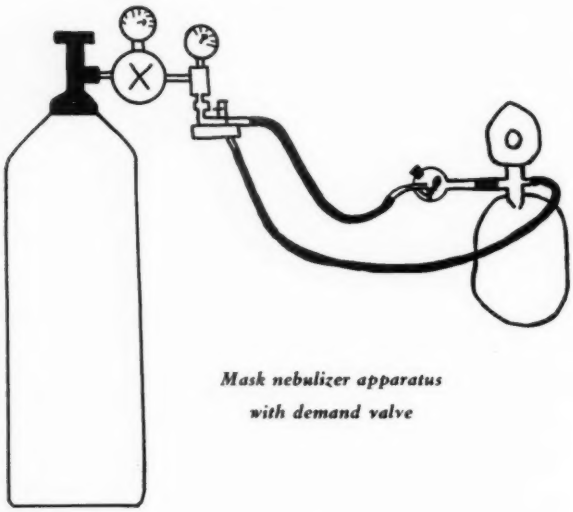
The open end of the Y tube is closed by a finger during inspiration and opened during expiration so that penicillin is nebulized during the inspiratory cycle only, generally at a flow of 6 to 10 liters of oxygen per minute. Spraying the throat with water from an atomizer before and during the inhalation may prevent throat irritation. Rinsing the mouth with water during treatment may prevent reddening or blackening of the tongue.

The demand valve results automatically in a delivery of oxygen and, therefore, nebulizes penicillin during inspiration by a slight lowering of negative pressure within the mask; generally employed with a flow of 10 liters of oxygen per minute.

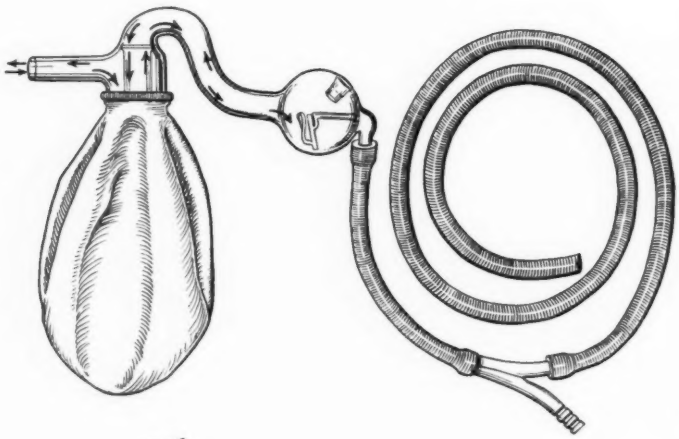
Dosage usually recommended is 50,000 to 100,000 units followed by 0.5 cc. rinse, four to five times daily.



Nebulizer with Y-tube



Mask nebulizer apparatus with demand valve



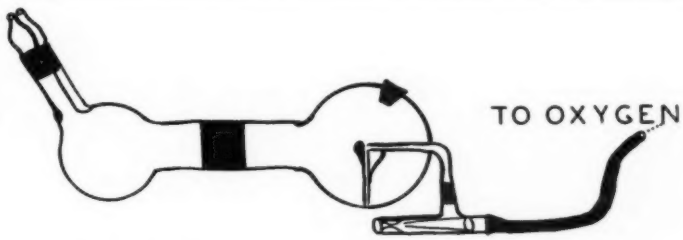
Nebulizer with rebreathing bag

NASAL INHALATION IN CONJUNCTION WITH INTERMITTENT NEGATIVE PRESSURE

The open end of the venturi is closed by a finger so that penicillin is nebulized for four breaths. The finger is then released and the patient swallows, creating a negative pressure of approximately 60 mm. Hg. in the nasal passages and antra, with an oxygen flow of 6 liters per minute with the glass venturi and 10 liters per minute with the metal venturi tube. The procedure is repeated until the penicillin solution is completely nebulized.

Dosage usually recommended is 50,000 units in 1 cc. normal saline, followed by 0.5 cc. rinse, four times daily.

Simplified negative pressure sinus apparatus



EXPERIMENTAL STUDIES

BLOOD LEVELS AFTER 50,000 UNITS PENICILLIN AEROSOL

Method of Administration	*No. Tests*	*Blood Levels (Units/cc.)* ½ *hr.*	*1 hr.*	*2 hrs.*
Cold, dry aerosol, calcium penicillin	91	0.10	0.08	0.04
Warm, humidified aerosol, calcium penicillin	37	0.11	0.11	0.06
Cold, dry aerosol, crystalline sodium	81	0.16	0.11	0.06
Warm, humidified aerosol, crystalline sodium	14	0.18	0.16	0.10

SPUTUM PENICILLIN LEVELS

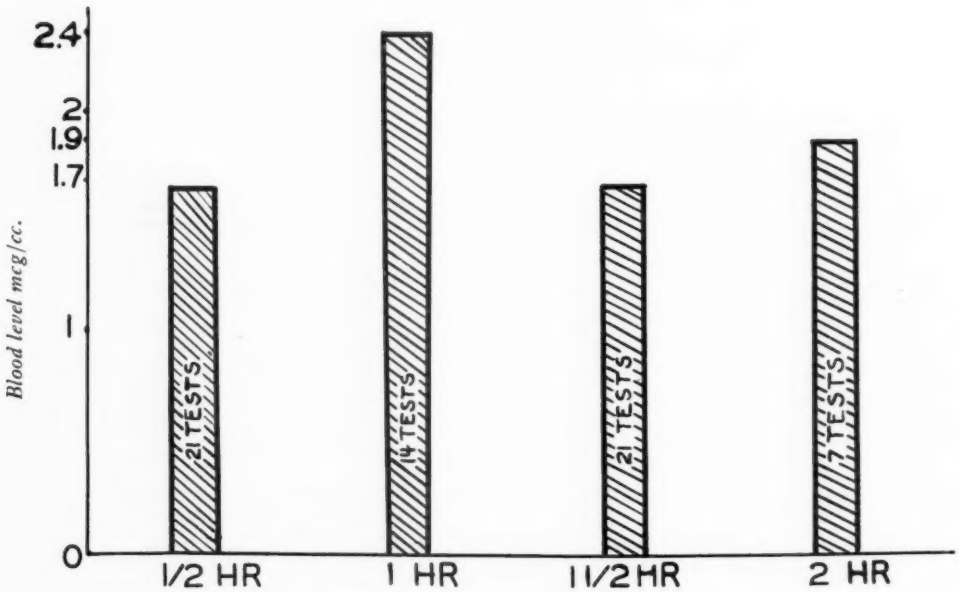
Method	*No. Tests*	*24-Hour Dosage (Units)*	*Sputum Volume (cc.)*	*Sputum Penicillin Level (Units/cc.)*
Aerosol	15	200,000-400,000	2-100	3-250
Intramuscular	27	240,000-800,000	24-285	0

No. Tests	Dosage (24 hrs.)	Sputum Vol. (cc.)	Sputum Penicillin Level (U/cc.)	Urine Penicillin Level (U/cc.)
PENICILLIN AEROSOL—MASK NEBULIZER TECHNIC				
2*	200,000	830	0.5	4
1	300,000	150	32	8
2*	400,000	50	15	7.5
2*	500,000	397	245	20
1	500,000	290	10	32
MASK NEBULIZER TECHNIC WITH DEMAND VALVE				
1	150,000	192	20	0.4
1	300,000	160	40	4
2*	400,000	50	32	5
1	500,000	144	80	32

Two tests on same patient

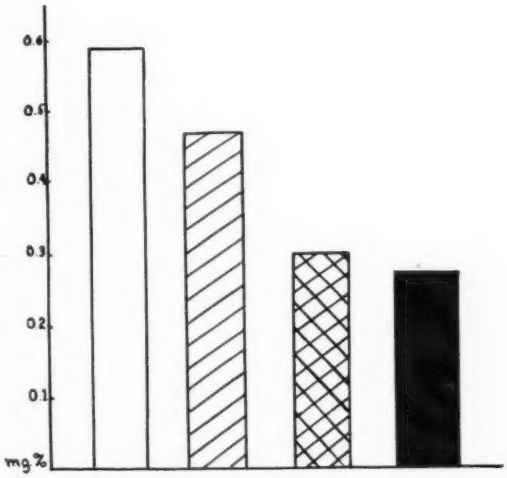
STREPTOMYCIN AEROSOL
MOUTH INHALATION APPARATUS

0.4 gm. in 2 cc. distilled water, with 1 cc. rinse



Sputum level in 8 cases collected for three hours varied between 20-1200 mcg/cc.

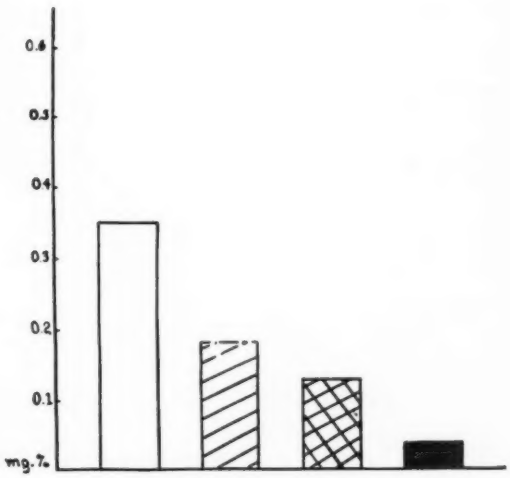
	No. Tests	*Dosage (24 hrs.)*	*Sputum Volume (24 hrs.)*	*Sputum Level (24 hrs.)*	*Urine Level (24 hrs.)*	*Blood Levels*
Streptomycin aerosol with mask nebulizer technic	12	2 gm.	14-1050 cc.	0-450 mcg/cc.	0-200 mcg/cc.	4 tests: ½ hr.—3.9 mcg/cc. 2 hrs.—5 mcg/cc.
	2	4 gm.	37-63 cc.	30-66 mcg/cc.	60-166 mcg/cc.	1 test: 1 hr.—7.5 mcg/cc.
Streptomycin aerosol mask nebulizer technic with demand valve	4	2 gm.	144-1200 cc.	0-320 mcg/cc.	12-250 mcg/cc.	
	1	4 gm.	50 cc.	400 mcg/cc.	110 mcg/cc.	1 test: ½ hr.—25 mcg/cc. 2 hrs.—5 mcg/cc.
Streptomycin by intramuscular administration	13	2-3 gm.		0		3 tests: 1 hr.—33 mcg/cc. 2 hrs.—25 mcg/cc. 3 hrs.—17 mcg/cc.



Mouth Breathing

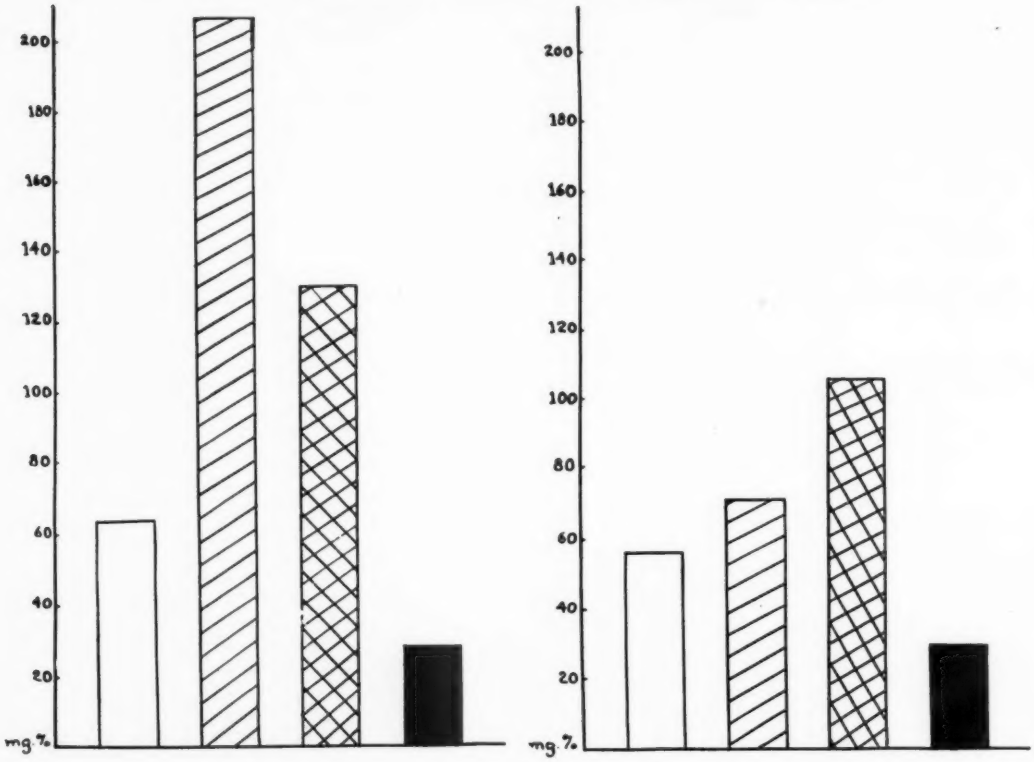
SULFATHIAZOLE LEVELS WITH MASK NEBULIZING TECHNIC

Blood Levels



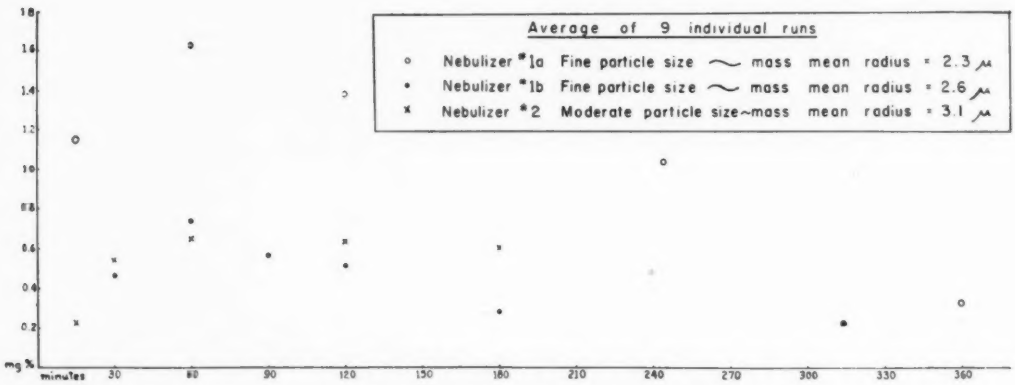
Nose and Mouth Breathing

SULFATHIAZOLE LEVELS WITH MASK NEBULIZING TECHNIC



Sputum levels

BLOOD ABSORPTION CURVES WITH MASK NEBULIZING TECHNIC



5 cc. Combisul (5% sulfathiazole-5% sulfadiazine) in distilled water given as one inhalation using demand valve at 8-10 liters oxygen flow/minute.

AVERAGE SULFATHIAZOLE LEVELS AFTER INHALATION OF 5 CC. 5% SODIUM SULFATHIAZOLE WITH MOUTH NEBULIZER TECHNIC

	No. Tests	*Blood 1 hr.*	*No. Tests*	*Sputum 2-4 hrs.*	*No. Tests*	*Urine 2-4 hrs.*
	39	1.13 mg. %	32	15.32 mg. %	32	30.16 mg. %

AVERAGE SULFATHIAZOLE LEVELS AFTER INHALATION OF 10 CC. 5% SODIUM SULFATHIAZOLE WITH MASK NEBULIZER TECHNIC

	No. Tests	*Blood 1 hr.*	*Sputum 0-2 hrs.*	*Urine 0-2 hrs.*
Breathing through nose and mouth	27	0.21 mg. %	78.7 mg. %	5.4 mg. %
Breathing through mouth only	27	0.45 mg. %	136.6 mg. %	4.8 mg. %

CASE REPORTS

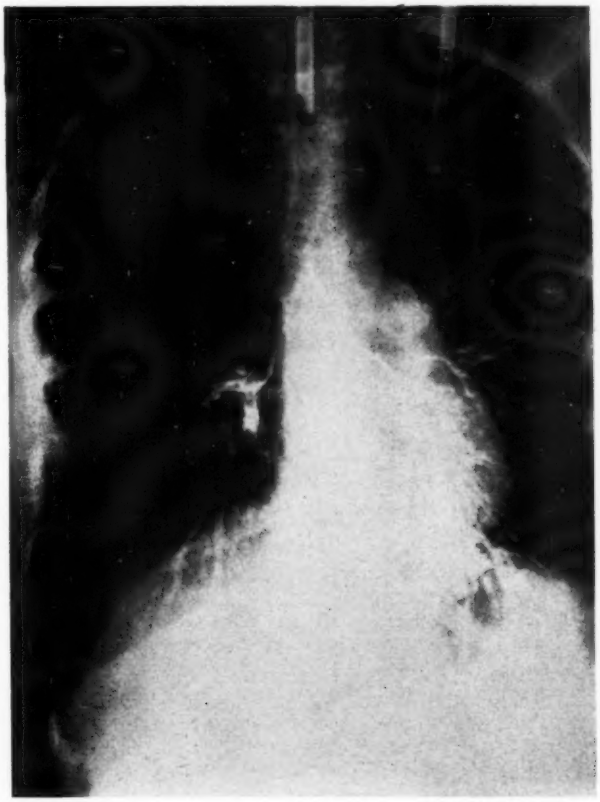
BRONCHIECTASIS

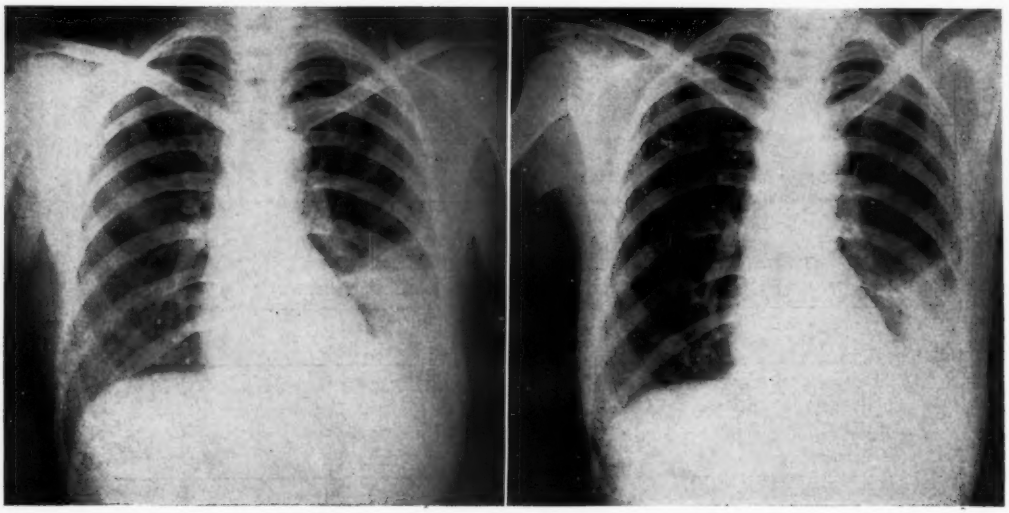
Bronchogram: Cylindrical bronchiectasis of left lower lobe. Female, 29 years, had failed to improve clinically with previous course of 4,000,000 units intramuscular penicillin in twenty-five days.

Marked clinical improvement on continuous penicillin aerosol treatment 50,000 units three times daily for ten weeks preoperatively.

Uneventful lobectomy and postoperative course one year ago without sequelae.

Sputum culture: Before treatment—streptococcus hemolyticus, streptococcus anhemolyticus, staphylococcus aureus. After treatment—escherichia coli.

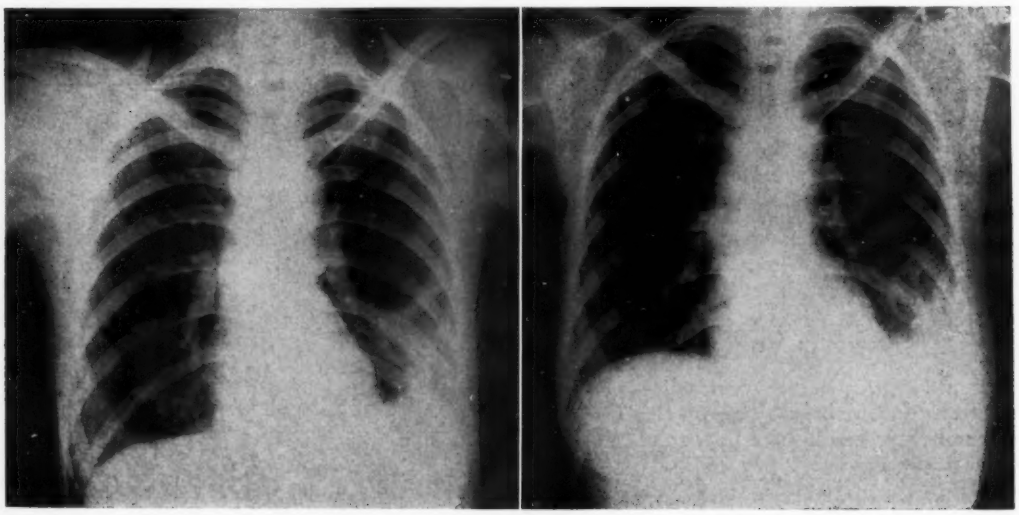


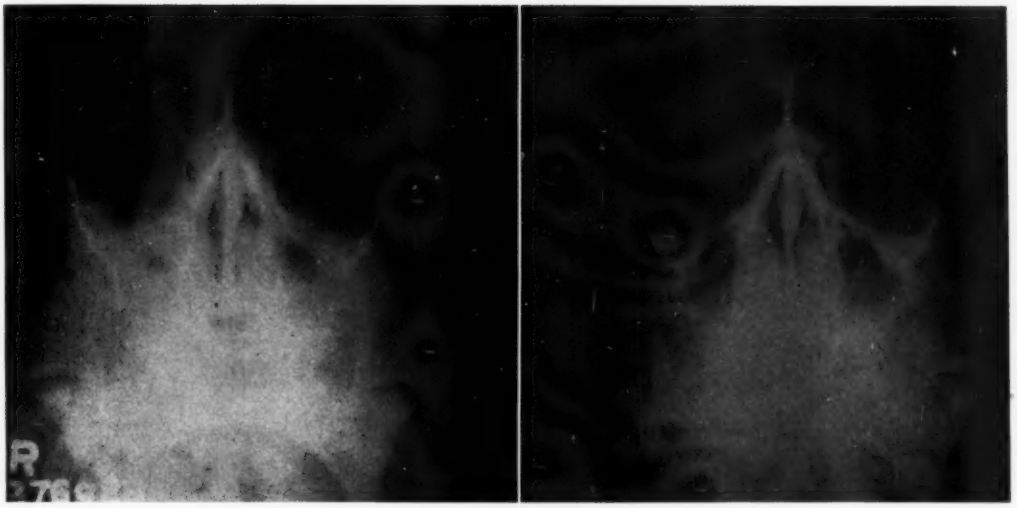


ACUTE LUNG ABSCESS

Female, 40 years, treated with combined intramuscular (1,440,000 units) and aerosol (3,000,000 units) penicillin for twelve days with some x-ray clearing of pneumonitis and decrease in size of abscess cavity. Substitution of helium-oxygen mixture to nebulize penicillin during following thirteen days, with total of 3,250,000 units aerosol and 1,920,000 units intramuscular penicillin resulted in more rapid and more complete x-ray clearing, with slight persisting fibrosis but no residual lung abscess.

Complete x-ray clearing on film taken five weeks after hospital discharge. Sputum culture: Before treatment—streptococcus viridans, staphylococcus aureus. During and after treatment—aerobacter aerogenes.





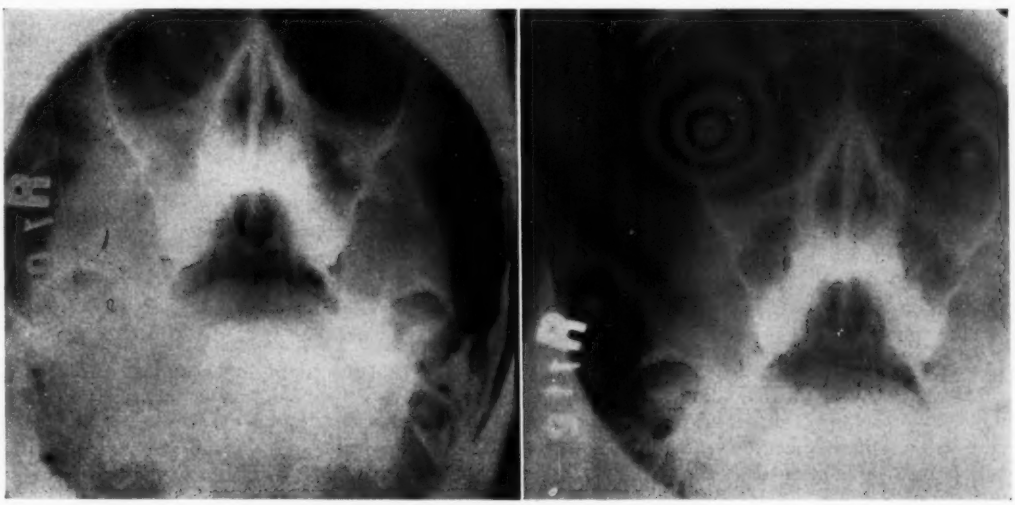
CHRONIC SINUSITIS

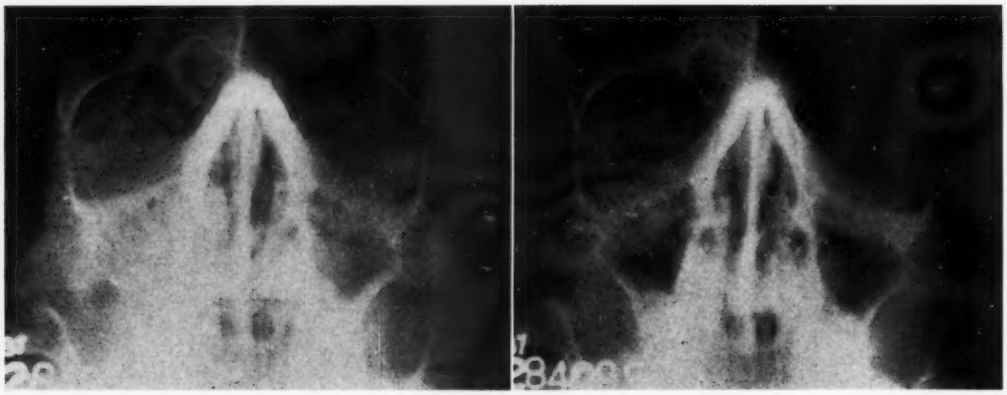
Male, 15 years, treated with penicillin aerosol and negative pressure, 50,000 units two or three times daily for eleven days. X-rays revealed clearing of the ethmoids and both antra.

Patient remained asymptomatic for over six months when he had an acute flare-up of sinusitis and was treated with penicillin aerosol and negative pressure, 50,000 units two or three times daily for ten days.

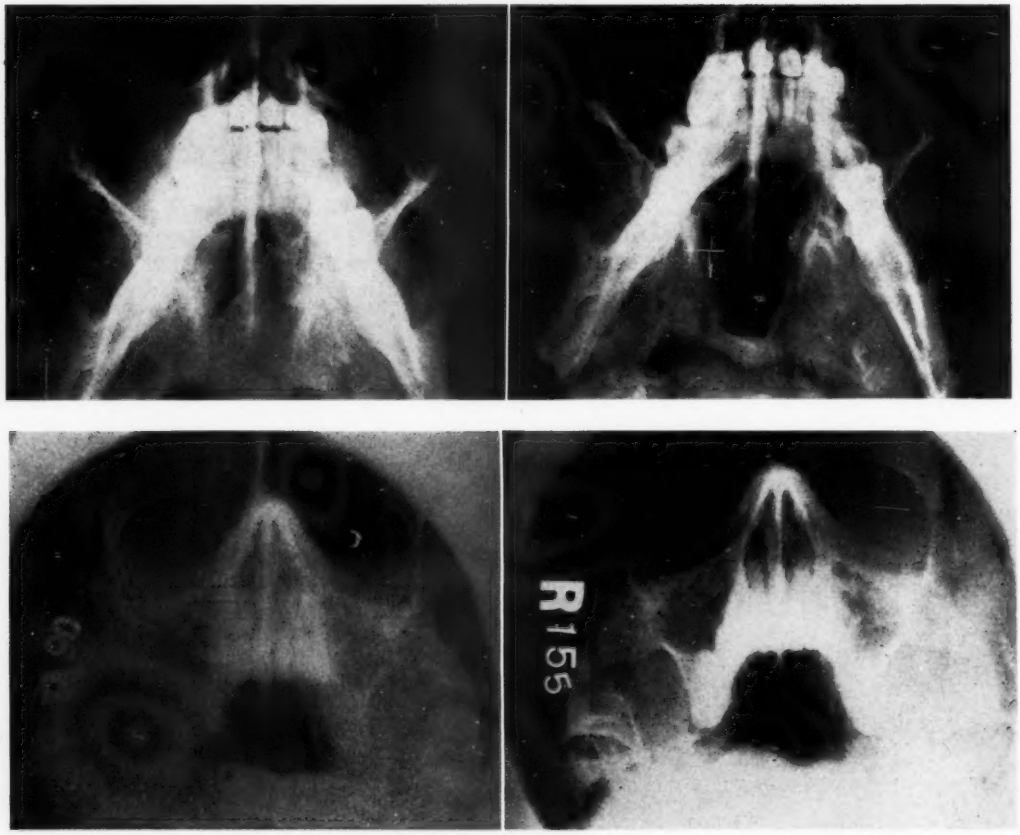
Marked x-ray clearing of right antrum and moderate clearing of left antrum. Marked symptomatic improvement, sustained for past eighteen months.

Throat culture: Before treatment—staphylococcus aureus. After treatment —aerobacter aerogenes.



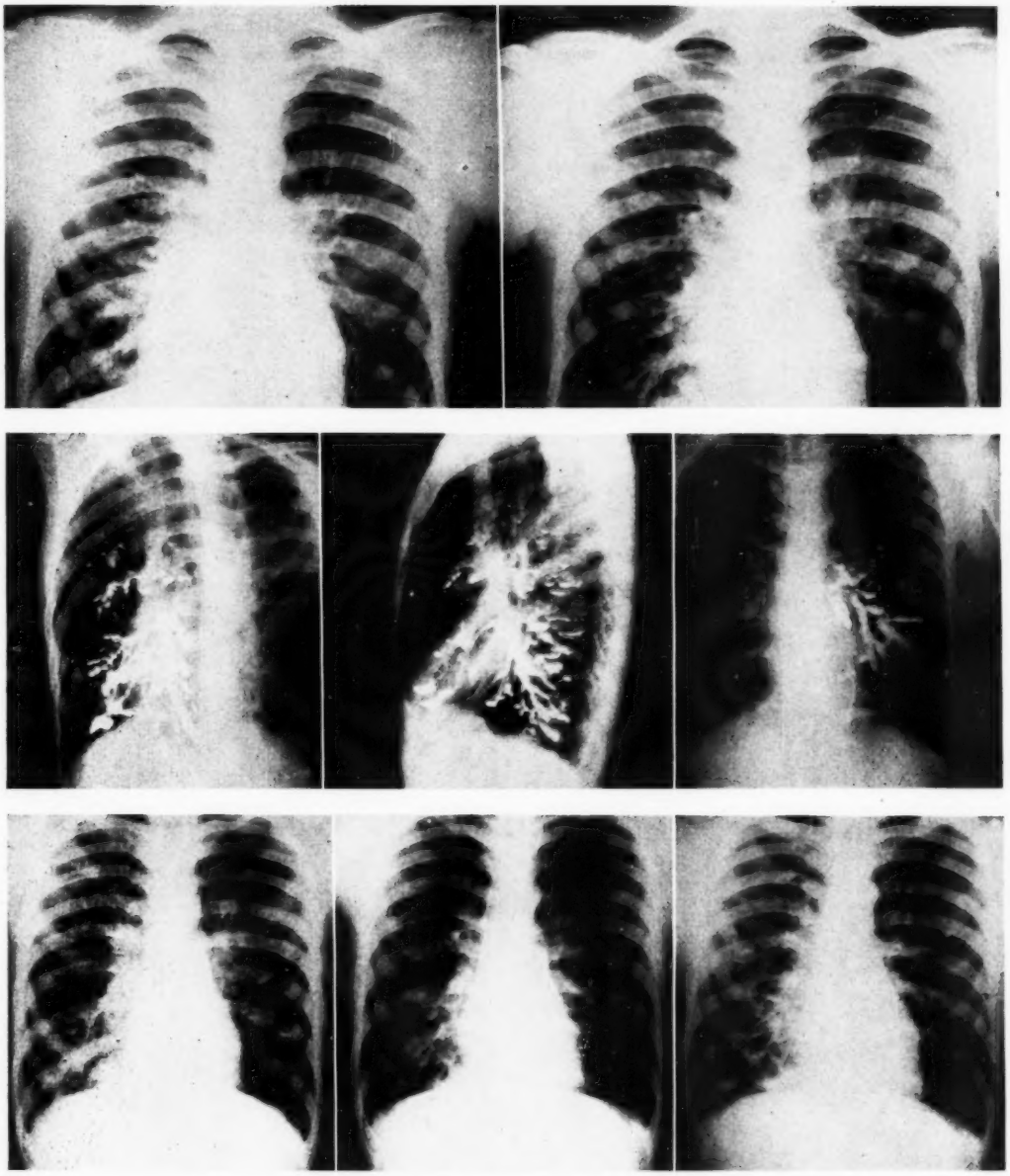


Antral views (First course)



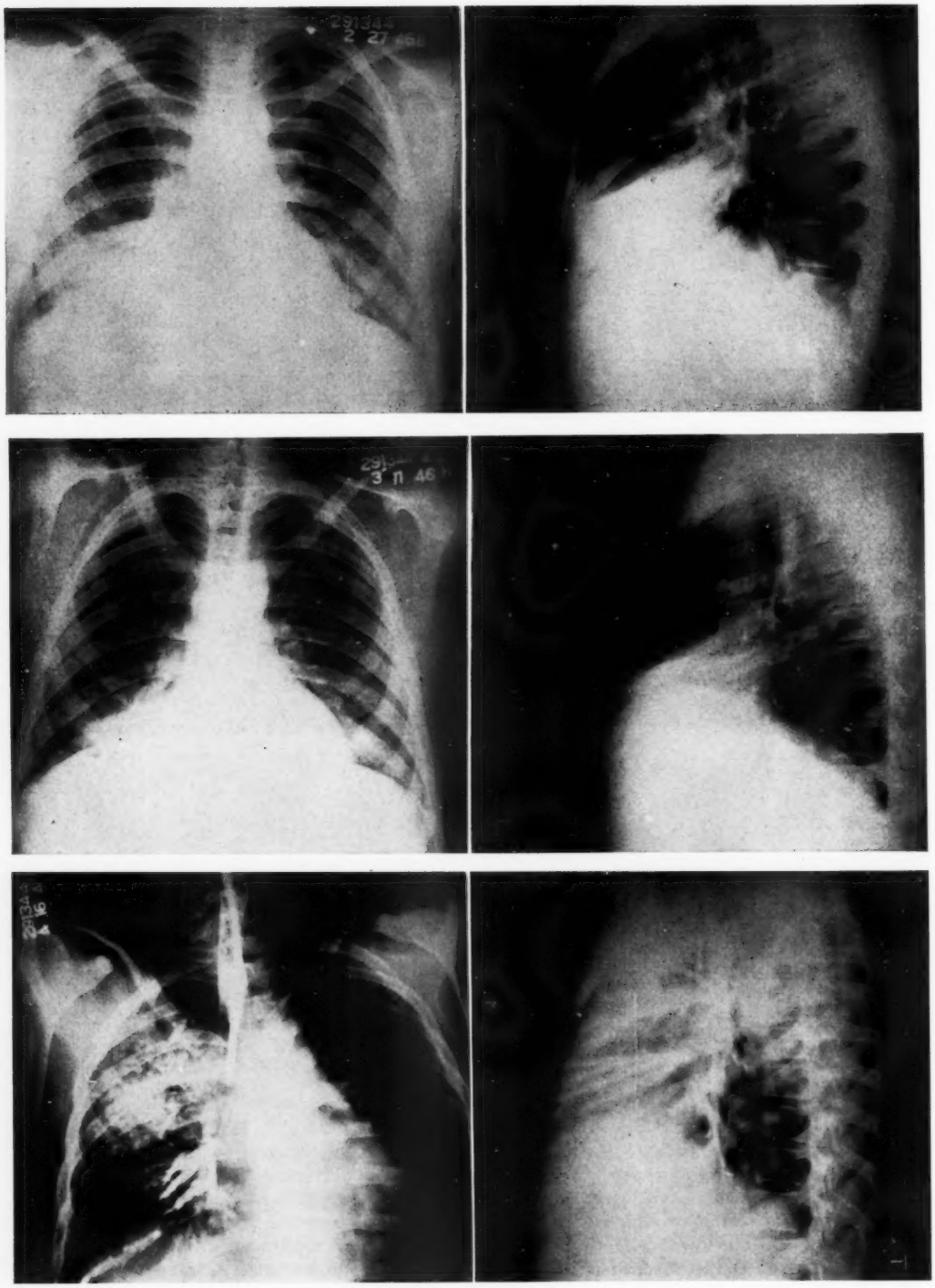
CHRONIC SINUSITIS

Male, 33 years, treated with penicillin aerosol and negative pressure, 50,000 units four times daily for three weeks. X-ray showed complete clearing of sphenoid sinuses twelve days after institution of therapy. Marked symptomatic improvement for two months when patient had acute flare-up of maxillary sinusitis, although sphenoids remained clear. Treated with penicillin aerosol and negative pressure 50,000 units, four times daily for ten days. Moderate x-ray clearing at end of course; marked symptomatic improvement sustained for over six months. Sputum culture: Before treatment—streptococcus viridans. After treatment—aerobacter aerogenes.



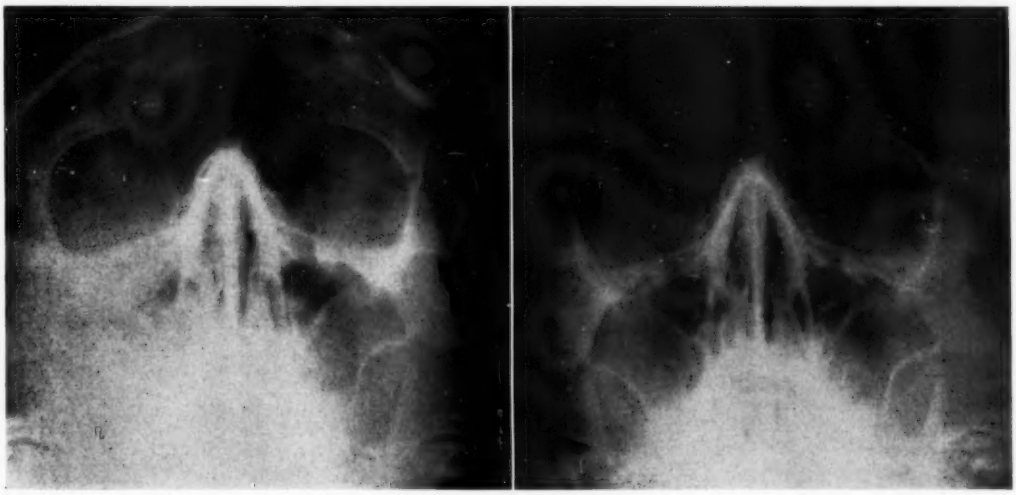
BRONCHIECTASIS, BRONCHIAL ASTHMA, PULMONARY EMPHYSEMA

Male, 22 years, chronic respiratory invalid showed striking sustained clinical improvement since continuous penicillin aerosol therapy was started two years ago with dosage of 50,000 units four times daily. Recently treated for two weeks with streptomycin aerosol, 1 gram daily, combined with usual dosage of penicillin, without further change. X-ray clearing of areas of pneumonitis and moderate decrease in extent of peribronchial infiltration, despite permanent structural damage and increase in size of cystic areas in right lower lung field. Sputum cultures: Before treatment—streptococcus viridans. During treatment—escherichia coli (no growth while on streptomycin plus penicillin).



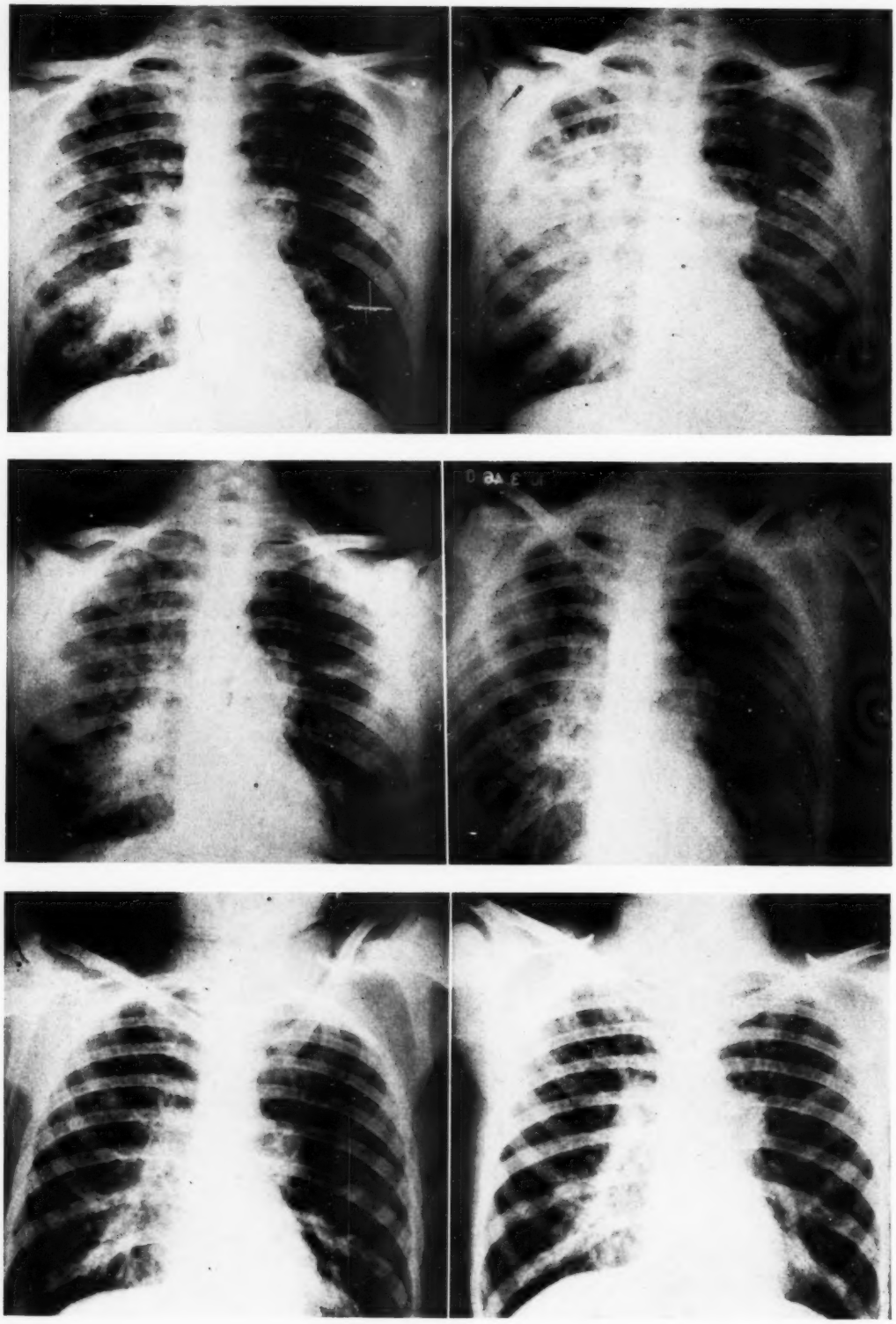
(Opposite page and above) **SUPPURATIVE PNEUMONIA**

Male, 16 years, entered hospital with suppurative pneumonia of RML, and some involvement of both lower lobes. Treated with total of 8 million units intramuscular penicillin in first three and one-half weeks, combined with penicillin aerosol (total 5 million) in the latter two weeks, followed by one week of aerosol alone. Definite clinical improvement. Repeat bronchoscopy revealed a nonaerating RML; penicillin aerosol administered for three and one-half weeks, doubling dosage and using helium-oxygen mixture for nebulization (total 10 million units). Neosynephrin, 1 per cent, inhaled prior to each treatment. Patient became asymptomatic; bronchoscopy revealed a patent rim bronchus, and lipiodol now penetrated into the RML without evidence of abscess cavity or bronchiectasis. Sputum culture: Before treatment—staphylococcus albus. After treatment—escherichia coli.



ACUTE AND CHRONIC SINUSITIS

Female, 33 years, treated with single daily inhalations (40,000) units for a total of seven treatments in twelve days. X-ray showed marked clearing of right antrum and moderate clearing of left antrum. Symptomatic improvement sustained for over six months.



(Opposite page)

SUPPURATIVE BRONCHOPNEUMONIA, BRONCHIAL ASTHMA, CHRONIC BRONCHITIS, CHRONIC SINUSITIS

Male, 16 years, had responded with marked improvement to sinus penicillin aerosol combined with intermittent negative pressure one and one-half and one year previously. Present admission for severe bronchopneumonia caused by hemolytic staphylococcus aureus, which showed very little response to a regimen of intramuscular penicillin for three weeks, dosage raised to four million units daily in the latter ten days. Penicillin resistance of organism was five units per cc. Substitution of continuous penicillin aerosol in dosage of only one million units daily for seven days resulted in striking clinical improvement, moderate x-ray clearing, and disappearance of staphylococcus aureus on sputum cultures and bronchoscopic aspiration, escherichia coli predominating. Staphylococcus aureus reappeared when aerosol was stopped, but disappeared again on regimen of penicillin aerosol, 100,000 units four times daily for eighteen days. Chest x-ray showed a residual diffuse fibrosis and enlarged node in left hilar region, although patient has remained fairly well at home for past eight months.

CHRONIC SINUSITIS

Male, 50 years, treated with penicillin aerosol and negative pressure, 25,000 units two or three times daily for fourteen days.

X-rays revealed initial increased involvement of left antrum with subsequent appreciable clearing.

Clinical improvement has been sustained for past fifteen months.

Sputum culture: Before treatment—staphylococcus aureus-streptococcus anhemolyticus. After treatment—streptococcus viridans.

EXPERIMENTAL

Cafergone For Relief of Headache

ROBERT E. RYAN

ST. LOUIS

THE AGENT Cafergone is a preparation containing 1 mg. ergotamine tartrate and 100 mg. of caffein. Ergotamine tartrate is not a new drug so far as the subject of headache is concerned. It has been used for many years and has been very successful in aborting acute attacks of migraine. The preparation also contains caffein which has been used for the relief of headaches principally in combination with acetophenetidin and acetylsalicylic acid.

A previous report of the new product was made by Horton, Ryan, and Reynolds[1] early in 1948. The purpose of this report is to evaluate further the merits of the product in regard to the relief of certain types of headaches.

RESULTS

Of the 62 patients who were treated with Cafergone 46 or 74 per cent received excellent results; 6 or 9 per cent obtained some (good) results, and 10 or 17 per cent did not obtain any results at all (poor). As stated previously the toxic symptoms were all of the abdominal distress type.

Some of the patients included in this report were so enthusiastic about the relief obtained from their headache attacks with Cafergone that they wanted to use the preparation habitually at certain hours of the day when they usually had their attacks. This, of course, was discouraged. All of the patients who experienced excellent results carried these tablets with them everywhere and would not dare part with them.

TABLE 1

ADMINISTRATION OF CAFERGONE IN CASES OF HEADACHE

TYPES OF HEADACHE	CASES	SIDE EFFECTS	RESULTS		
			EXCELLENT*	GOOD**	POOR***
Migraine	40	3	32	3	5
Histaminic cephalgia	12	2	9	2	1
Tension	10	0	5	1	4
Total	62	5	46	6	10

*Complete relief of symptoms.
**Partial relief of severity and duration of symptoms.
***Little or no relief of symptoms.

It should be pointed out that the best average dose of this product was found to be two tablets, not one. It might, therefore, be best for the manufacturer to have each tablet contain 2 mg. of ergotamine tartrate and 200 mg. of caffein. Another important factor in administration of this agent is to take the tablet at the onset of the attack of headache. If the tablet is taken after the headache is very pronounced, usefulness of Cafergone is very much less effective.

A very small percentage of the cases covered in this report experienced toxic symptoms. All of these toxic symptoms consisted of nausea and abdominal cramps and distress. Those experiencing nausea did not have any vomiting. Results obtained with Cafergone are shown in Table 1.

Cafergone is not a cure of the types of headaches studied in this report or of any other type of headache. However, it definitely seems to be an excellent preparation to use to abort headaches, especially those of the migraine and histaminic cephalgia types. In other types of headache the results are not as favorable, but any preparation which can help in the treatment of migraine and histaminic cephalgia should be well received.

REFERENCE

1. HORTON, B. T., RYAN, R. E., and REYNOLDS, J. L.: Clinical observations on the use of E.C.-110; a new agent for the treatment of headaches. Proc. Staff Meet., Mayo Clin. 5:105-108 (March 3) 1948.

The Medical Bookman

PSYCHIATRY IN GENERAL PRACTICE*

Macbeth: *How does your patient, doctor?*
Doctor: *Not so sick, my lord,*
As she is troubled with thick-coming fancies
That keep her from her rest.
Macbeth: *Cure her of that.*
Canst thou not minister to a mind diseas'd,
Pluck from the memory a rooted sorrow,
Raze out the written troubles of the brain
And with some sweet oblivious antidote
Cleanse the stuff'd bosom of that perilous stuff
Which weights upon the heart?
Macbeth: Act V, Scene iii.

PSYCHIATRY has been catapulted from a position of relative obscurity into one of great and sometimes embarrassing prominence in recent years. There is still need for a book which will provide medical men specializing in other fields and the general practitioner with a well charted map in the confusing territory of psychiatry, without causing the nonpsychiatrically trained practitioner to stumble and fall over the psychiatry language barrier.

To rephrase in the language of the author, "This volume is an attempt to lift psychiatry out of the realm of terra incognita for those whose primary efforts are spent in other fields. It is the author's firm belief that most of preventive psychiatry lies, and will continue to remain, in the hands of the general practitioner. This is so because the total number of psychiatrists, even if evenly distributed throughout the country, is inadequate to care for the number of patients needing help with their emotional problems. Fully half the patients to be found in *any* doctor's office have come because of emotional problems rather than organic disease. Only by removing the aura of mystery from the practice of psychiatry, can psychiatry be rendered a useful tool in the hands of those who deal with the greatest number of psychiatric patients."

This reviewer's feeling is that Dr. Thorner has accomplished his purpose in exemplary fashion. "Psychiatry in General Practice" devotes over 75 per cent of its pages to a highly intelligible description of the dozen or more "types" of patients most commonly seen in the general practitioner's office; this approach permits the reader to attempt his own psychiatric syntheses, and prepares him well for the brief analysis at the end of the book, the classification of mental disorders, and the description of therapeutic aims and technics.

The body of the book consists of fourteen chapters describing as many groups of patients which the reader immediately recognizes as people he has seen before. The first of these descriptive chapters deals with "Intelligent People" and the special difficulty they have in adapting emotionally and intellectually in a world in which they are members of a minority group. In six case histories replete with incidents which many will recognize as analogues of troubles their children and friends' children have had, the author draws a remarkably vivid picture of the discontent with routine, extreme independence, social hardships, early scholastic success, loneliness, and eventual emotional distress through which these precocious children live. The author's summary of this chapter condenses his presentation of the problem:

> Intelligence is a capacity for acquiring and using facts and is a native endowment in all people. In some the capacity is great, in others less. It cannot be increased, but less than full usage of intellectual capacity may be brought about by interfering emotional disturbances which are relatively frequent in the intellectually superior. Intellectual capacity may be diminished by destructive brain diseases and by the aging processes as in dementing people. Intellectually superior people make great demands on life for the opportunity to use their capacities, and the difficulty of obtaining this opportunity often involves frustrations and unhappiness that are spared to less gifted people.
>
> Everyone has emotional problems from time to time, but in both above and below average people problems are more frequent. Anyone who differs significantly from the majority of his fellow men is apt to find difficulty along the road. Sometimes the superintelligent person has elaborations of his difficulties that come close to being psychotic, although actual psychoses in superintelligent people are not signifi-

*Psychiatry in General Practice. By Melvin W. Thorner, M.D., D.Sc., Assistant Professor of Neurology, The Graduate School of Medicine, University of Pennsylvania. 659 pages. Philadelphia and London, W. B. Saunders Company, 1948. Price $8.00.

cantly more frequent than in subnormally or normally intelligent people. However, many have more or less severe personality and emotional struggles in childhood due to failure to fit in with children of the same chronological age. A superior intelligence is a mixed blessing carrying with it the possibility of positions of highest leadership and accomplishment on the one hand, and on the other the loneliness and misunderstanding which may be the cross anyone with unusual talents may have to bear.

"Dull People," those of less than average intelligence, present the other side of the coin. Their difficulty is in adapting to a world in which the majority of people are cleverer than they. Four very detailed and sympathetically presented case histories describe the generally affectionate, obtuse, backward child who is unable to meet the competition of his fellows at any stage: play progress, school achievement or the comprehension of life's concrete and abstract problems.

The dull person is "unable to perceive facts and realize their relationship to each other in any useful semblance of order. Because of this low intellectual capacity he is easily satisfied with the simpler aspects of living and less irked than most by dullness and routine. He learns slowly and painfully and has no great urge to exceed his own capacities. Industry has great need for people with the less marked varieties of mental deficiency, for there are many routine tasks to which they are admirably suited. However, certain social problems arise which are peculiar to the mentally deficient.

Such individuals must be protected against being outsmarted and unfairly treated by more intelligent, but less scrupulous, people. Dull people are an easy prey to rabble rousers, cultists, and agitators who incite them with strident and repetitious propaganda. They must be hindered from acts which their ignorance prevents their recognizing as crimes against society. Dull people frequently have emotional difficulties and, since they are less able to solve their own problems than most, the services of the physician and of the educator are often required to help them reach the best compromises with life of which they are capable.

In "People and Catastrophes," Dr. Thorner presents the patient as the product of the impact of an often hectic environment upon his sometimes limited hereditary capacities. War, disease, and social and economic failure occupy an important place in human economy. These events are blamed as the cause of all the trouble almost invariably when followed by emotional or physical suffering. "All people react in some way to the catastrophe or it would not be so labelled, but each person responds to adversity in his own characteristic fashion. Just as weeds grow only in suitable soil, and in a suitable climate, so do the more prolonged mental disturbances persist only in the mental soil which gives them nourishment."

"Unhappy People" may represent simple situational unhappiness, may be unhappy in connection with other emotional disorders, or may suffer actual manic-depressive disease. Many external factors, social and economic, effect the happiness of all people; however, the major factor which determines whether a man shall be happy or sad is his internal and not his external resources.

There are unhappy people who report to the doctor ascribing external causes for depression. The reader will recognize: "My wife does not understand me"; "With the world in such a mess, what have any of us to look forward to?"; "The children are more than I can take and I am worn out caring for them."

Also readily recognized are the commonly assigned internal causes for depression: "My family is in a bad way and it is all due to the way I have failed them as a father"; "If only I hadn't been so untrue to my wife, I'd be all right today."

Dr. Thorner mentions many other patient-authored rationalizations for chronic unhappiness. It is pointed out significantly that prolonged depression is not confined to those who suffer from manic-depressive disease. Susceptible neurotic people not infrequently present pictures of unhappiness of a prolonged type. Similarly it should not take too much diagnostic discrimination to identify the healthy people in whom overwhelming misfortune may produce prolonged periods of unhappiness. Superb case histories serve to illustrate these common conditions and help the reader to define his own conceptions of normal and abnormal reactions to adversity.

In the author's words, "A certain amount of caused and apparently causeless unhappiness is an integral part of life itself and the normal forces of restitution are quite adequate to compensate for the situation in any healthy person. . . . In most people the transitory nature of the distresses life brings to every person is characterized by the Biblical statement, 'Weeping may endure for a night, but joy cometh in the morning.' The frequent repetition of this quotation to a depressed patient often seems effective in introducing some ray of hope into his grey life.

"Age has a very definite effect upon a person's susceptibility to depressions. In the young, depressions are uncommon, while in older people depression is a relatively frequent syndrome as in the senile dementia and in the psychiatric conditions of late middle life—the 'involutional' period. The

depressions which are seen in young people always carry with them the suspicion that they are the harbingers of manic-depressive disease and that repeated episodes may be expected to occur. However, the depressions of the young are each apt to be short-lived compared with those of older people, where the zest for living and the striving toward goals are at a lower ebb."

DEMENTING People" lose the ability they once possessed of reasoning, remembering, and calculating. Pathologic processes which permanently destroy bits of brain tissue are not the least of many things that may happen to change the mental life of a man. The pathology may be traumatic, inflammatory, or degenerative, but the result is the same. Almost anyone who survives long enough dements to a greater or lesser degree from senile changes and arteriosclerosis. The carefully recorded case histories in this chapter illustrate dementia resulting from paresis, encephalitis, uncontrolled diabetes, avitaminosis, epilepsy, space-taking lesions within the skull, trauma, alcohol and other poisons.

The brief story of a boy suffering from a primary infection of the brain itself is one most readers can reproduce from their own practices:

Harry Stack was a nice boy who had an average number of broken windows to his credit, and more than a passing acquaintance with the truant officer. His grades in school were a little better than satisfactory to him, and a little less than satisfactory to his parents. What Harry really liked was a good game of rough and tumble football or baseball. It was a little difficult to get him to go to the store on errands, but he could always be counted upon to be on time for dinner. His breakfast hour was somewhat unpredictable.

Harry was no real source of concern to anybody except his mother who thought he should be more careful of his clothes. His health was good except that he had teeth which stood out valiantly against neglect until it was more than enamel and cementum could bear, but Harry could be induced to go to a dentist only by the more severe variety of toothache.

In the winter of his great affliction Harry was disappointed. He waited and waited for snow, but none came. There was just an intermittent drizzle of rain with a cold wind to rub it in. Harry moped around the house because there wasn't anything else to do. He had one bad cold and then got over it. A few weeks later the "grippe" began to make its rounds. First Harry's mother got it and then he got it. His mother tied a bag of camphor around his neck and gave him lots of sage tea, but poor Harry got worse and would hardly answer when he was spoken to. With a sigh for the budget his mother called in the doctor.

It was a long time after the epidemic of "grippe" had left the town with the coming of spring before Harry's stupor lightened a little. When he spoke it was a queer "mouthy" tone because he was having so much difficulty in making his tongue, lips, and larynx cooperate. With the passage of time he gained more strength and better voice. He never returned to the state of the normal, mischievous boy who had gotten sick. Where he had been active and gregarious he was now seclusive and quiet. His mischiefs had been of a light-hearted, unthinking kind; now they were sly and contained premeditated barbs. He had been well liked before, but now he was only tolerated.

A short trial at school when he was well enough to go convinced everyone concerned that the academic life was forever closed to him. He was not able to do the same level of work he had done before he had the "grippe." Forced to stay at home he tried his mother sorely. He demanded a great deal of attention and lost his temper violently when crossed. His muscles became stiffer and his face blanker. During periods of relative repose the fingers of his semi-flexed arms began to display an incessant, tremulous motion. These physical difficulties, as well as the mental deficits which were daily becoming more prominent, made the necessity for institutional care obvious.

At the state mental hospital Harry was found to have the neurologic syndrome of paralysis agitans with a blank facial expression, coarse tremors at rest, rigidity, and a festinate gait. His behavior was odd and he frequently differed with the attendants and doctors as to what was best for his welfare. He showed a little reasoning ability and a formal psychometric estimation was low but necessarily inaccurate. It showed a wide scatter in Harry's ability to perform intellectual tasks, but most of the tests fell below the eight-year-old level.

"Confused People" are often just overtired or may be suffering emotional stress beyond their capacity to endure. Complete recovery is the rule. The toxic psychosis may be secondary to infection, hyperthyroidism, diabetes mellitus, acute alcohol intoxication, barbiturate poisoning, and other endogenous and exogenous toxins. Recovery in these instances is usually dependent upon elimination of the offending agent and/or treatment of the underlying pathologic physiology.

"Anxious People" demonstrate a variety of neurotic states: hysteria, obsessions and compulsions, somatic conversion symptoms, and anxiety neuroses. In the words of Schopenhauer, "Hypochondria is a species of torment which not only makes us unreasonably cross with the things of the present, not only fills us with groundless anxiety on the score of future misfortunes entirely of our own manufacture; but also leads to unmerited self-reproach for what we have done in the past."

That abnormal emotional states, chiefly anxiety, produce physiologic changes in the autonomic nervous and endocrine systems, and elsewhere, is the thesis of the new school of psychosomatic medicine. Here, in proper relation to other psychi-

atric considerations, is discussed the interrelation between anxiety and the physiology of the human body. The discussion also concerns itself with the etiologic role long continued anxiety plays in such conditions as essential hypertension, ulcerative and mucous colitis, hyperthyroidism, asthma, peptic ulcer, and the so-called neurogenic dermatoses.

It is properly pointed out, at the end of a chapter replete with brilliantly recorded case histories, that anxious people are not immune to physical disease. "Neither the diagnosis of anxiety nor of any other psychiatric condition can be safely made by the exclusion of anatomic or metabolic disease, alone. Diagnosis by such exclusion presumes that all possible anatomic and metabolic diseases are known to the examining physician, that adequate diagnostic tests exist for all, that these tests have all been competently done, and that they are negative in result. Symptoms unsupported by available physical evidence are not necessarily pathognomonic of a disturbed emotional state. The diagnosis of an anxiety state is an independent diagnosis which can be made whether other disease exists concurrently or not. It is made on the basis of the history, the type of symptoms the patient has, whether the symptoms are purposeful, whether overt anxiety is present, and the defensiveness with which the patient resists any attempt to minimize the ominousness of his symptoms."

"Suspicious People" are often simply the products of our deeply rooted instincts for self-preservation. "Each person has certain features of his existence which are most highly prized by him and constitute his image of his own individuality. A rich man may clutch his wealth with a tenacity made stronger by the threats he sees in the envy of his less favored neighbors. A native of one country patriotically defends his national individuality against the real or fancied threats of the natives of other countries. In the period following the Civil War many Southerners were suspicious of any Northerner. A white man may wonder if the mere existence of the Negro does not constitute a challenge to his own superiority."

While suspicion of real or fancied threats against one's existence is part of normal living, pathologic suspiciousness is found in a large variety of illnesses (paranoid conditions), or it may be the essential element in the "steely cold, logical system of suspicions of the true paranoiac."

Common among the paranoid conditions is that accompanying physical illness. People who are not psychotic may give way to an obvious episode of unwarranted suspiciousness under the impact of personal reverses and/or physical disease. Especially pertinent is Dr. Thorner's case history describing the pathologic suspiciousness of his colleagues which appeared in a "Dr. Morgan" during physical illness. To summarize the story, "Mrs. Morgan does not permit her husband to work too hard, or to forget his rubbers on rainy days. She knows that fatigue, economic worry, or infections, are stresses which are apt to make Dr. Morgan paranoid."

In readable, incisive and commendably thorough fashion Dr. Thorner devotes separate chapters to "Queer and Twisted People," "People and Sex" and the special problems of older people, children, and "The Rest of Us."

The last two sections of the book are devoted to discussions of psychiatric and physical examinations, the patient's viewpoint, therapeutic procedures, classification of mental disorders, and commitment procedures.

These discussions contain analyses which follow naturally and logically from the syntheses of the previous fifteen chapters. In them one may find much necessary practical information as well as many interesting patient histories illustrating the use of short forms of psychotherapy available to all physicians: personal orientation, reassurance, persuasion, and suggestion. In general practice and in the specialties, these short forms of psychotherapy may be the mainstay of treatment for many patients and are appropriately analyzed in detail, while the specialized procedures reserved to psychiatrists are described more briefly.

According to Alexander Pope, "The proper study of mankind is man." Dr. Thorner has produced a book about man which should interest every physician. The understanding which is afforded by his approach to the problem of "Psychiatry in General Practice" will be of daily help to general practitioner and specialist alike. Many of the clinical histories are small literary masterpieces, some with an O. Henry twist at the close. These, possibly the most valuable portion of the work, will be treasured by even the casual reader and used later to illuminate the darkness and fog which so often initially obscure the problems of our emotionally distressed patients.

E. C.

New Books Received

► MANUAL OF CLINICAL LABORATORY METHODS - - -

By Opal E. Hepler, Ph.D., M.D., Associate Professor of Pathology, Northwestern University Medical School; Director of the Clinical Laboratories, Montgomery Ward Clinics and Passavant Memorial Hospital, Chicago. 4th Edition, 387 pages, illustrated. 1949, Charles C Thomas, Springfield, Illinois. Price $8.50.

Starting as an outline to guide students in the laboratory in the course in clinical pathology at Northwestern University Medical School, the work has evolved into the present text. Detailed instructions are given for each procedure followed in the various tests conducted in the laboratory by medical students and medical technicians. For each test, the discussion includes: principles of the test, various steps (in the order of performance), calculation of results, interpretations and significance, and sources of error. Coverage of material is very complete and the latest and most practicable methods are given in each instance.

A. E.

► THE SKIN DISEASES - - -

By James Marshall, M.D. 1948, Cambridge, at the University Press; New York, The Macmillan Company. Price $7.50.

James Marshall has written what is intended to be a handbook for the general practitioner or a textbook for the medical student; he fulfills that purpose quite well.

The first portion of the book, with its introduction and description of primary lesions, anatomy, diagnostic approach, and principles of treatment, is better than average for a small textbook. The section on specific therapy, however, is frequently vague.

The text for the more common dermatoses in the main is not too complete. The greatest error appears to be the effort to include many of the rare dermatoses without giving them more than passing notice. As a result, the less common dermatoses are sometimes vaguely alluded to but inadequately described.

Some of the classification and concepts differ from those entertained in the United States, and in fact, the British outlook is very apparent in many sections.

The book is generously supplied with good black and white illustrations and also has a few illustrations reproduced in color.

I. F.

► THE CLINICAL MANAGEMENT OF VARICOSE VEINS - - -

By David Woolfolk Barrow, M.D. 155 pages, illustrated. 1948, Paul B. Hoeber, Inc., New York. Price $5.00.

This text, which is based on observations made by the author on approximately 2,500 patients with varicose veins, or their records, is limited to a study of varicose veins of the leg. In the twelve chapters of the monograph, Dr. Barrow discusses the diagnosis, therapy, and after-case of the varicose extremity. As the author states in his preface, ". . . Controversial points are minimized. References are few, and those usually to considerations of physiology or pathology which cannot be readily demonstrated by examination of the patient. . . . While it is realized that other technics may be equally applicable, the ones pictured here have given satisfactory results in the author's hands."

C. S.

► HEMATOLOGY - - -

By Cyrus C. Sturgis, M.D., Professor and Chairman of the Department of Internal Medicine, University of Michigan Medical School, and Director of the Thomas Henry Simpson Memorial Institute for Clinical Research, University of Michigan. 915 pages. 1948, Charles C Thomas, Springfield, Illinois. Price $12.50.

In this comprehensive study, Dr. Sturgis has extensively described and compared the disorders of the blood from a broad clinical aspect. He defines the blood picture of each of the disorders and chronologically reviews the findings from the earliest scientific knowledge to the latest developments and concepts.

The first ten chapters are devoted to the anemias and changes in the erythropoietic system. The discussion of the anemias begins with the simple chronic types, presenting related causes and treatments. In turn, follow descriptions of the iron deficiency anemias, anemias of pregnancy, hemolytic anemias, with 122 pages devoted to pernicious anemia and other macrocytic anemias.

Two chapters cover the hemorrhage state due to changes in the normal clotting elements of the blood and deficiencies in platelets. Great emphasis is placed on the role played by vitamin K and prothrombin in this respect. Also presented here is a classification of the hemorrhagic states.

In the portion of the book devoted to changes in leukocytes, the author describes in detail the various types of cells and discusses the sources of error found in counting and identifying them.

Along with the description of the leukemias and abnormalities of the granulocytes, there are several colored plates demonstrating the typical abnormal cells.

Lipidoses are described in a short chapter reviewing three diseases typical of this condition. The bone marrow picture in normal conditions and blood dyscrasias is presented, showing characteristic changes for varying conditions.

The final section of the book covers the most recent concepts of blood substitutes and blood transfusions.

The material is simply presented in an interesting manner with an adequate number of charts, graphs, and diagrams and well supplied with references.

M. F.

► DISEASES OF THE ADRENALS - - -

By Louis J. Soffer, M.D., Assistant Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University; Associate Attending Physician, The Mount Sinai Hospital, New York City. 2nd Edition, 320 pages, 45 illustrations, 3 color plates. 1948, Lea & Febiger, Philadelphia. Price $6.50.

Written in a crisp factual style, this three hundred page text gives one a vivid story of the structure and behavior of the adrenal gland in both health and disease. One section is devoted to the fundamentals of the chemical and mechanical tests which are so essential in studying and diagnosing adrenal diseases. Determinations of sodium, potassium, and chlorides in the serum and urine are described in detail. Procedures for doing biologic assays, salt tolerance test, water tolerance test, perirenal insufflation, and others are clearly defined.

Lengthy consideration is given to adrenal physiology, which is so important in understanding the various related disease entities. The relationship to blood electrolytes, to other endocrine glands, and to their hormones is explained in full.

The author classifies adrenal disease essentially as follows: (1) Destructive lesions of the adrenals, such as tuberculosis, atrophy, hemorrhage, etc., i.e., those conditions causing a clinical picture of Addison's disease; (2) tumors of the adrenal medulla and sympathetic ganglia; (3) tumors of the adrenal cortex, and (4) hyperplasia of the adrenal cortex. The endocrinologic significance of each of the disease entities is discussed in detail and a great deal of attention is given to the management and therapy of each.

Many excellent case histories and illustrations, including photomicrographic section, radiologic studies, and photographs of patients are interspersed throughout this edition.

D. F.

EDITORIALS

SENSITIVITY TO CHEMOTHERAPEUTIC AND ANTIBIOTIC AGENTS

Since the advent of the many new chemotherapeutic and antibiotic agents, the problem of allergic manifestations and sensitivity reactions has been considerably intensified. In a recent report, Dr. William B. Sherman, New York, stated that the sensitivity reactions which occur in only occasional patients are distinct from the usual toxic actions of the drugs, although in some instances present knowledge of the mechanism does not permit one to distinguish between allergic and toxic reactions with certainty.

Among the common reactions to drugs are symptoms of asthma and rhinitis which most often affect persons who suffer the same symptoms from other causes. Aspirin tends to cause these symptoms most frequently, but other occasional causative agents are the sulfonamides, penicillin, quinine, arsphenamine, vegetable gums and protein drugs such as pancreatin and papain.

According to Dr. Sherman, attacks of asthma caused by aspirin usually start within a few minutes of administration of the drug, because of its solubility and diffusibility, so that the relationship of cause and effect is quite readily apparent.

Fever, which is an important and confusing manifestation of drug allergy, is seen most frequently after administration of the sulfonamides, but is also caused by penicillin, streptomycin, thiouracil, iodides, and other drugs. Dr. Sherman observes that the temperature may rise to 105 or 106° F. and the leukocyte count may remain normal or rise as high as 30,000. The fever is often, but not always, accompanied by a rash and may easily be mistaken for one of the acute infectious diseases.

If it is recognized that the fever is due to a sensitization reaction, and subsides promptly when the causative agent is removed, it is rarely serious. On the other hand, in certain instances where fever from sulfonamide sensitization has been confused with a recurrence of infection and the causative drug continued, death has resulted from drug allergy.

Many types of skin eruptions, of which the commonest are urticaria, dermatitis medicamentosa and contact dermatitis, may result from drug allergy.

A variety of drugs cause jaundice, and with certain agents, such as chloroform and carbon tetrachloride, liver damage appears to be a normal toxic effect of the drug. Other drugs, such as the sulfonamides, arsphenamine, cinchophen and atabrine, tend to cause jaundice as a result of sensitization.

In addition to these more common symptoms of drug allergy, other reactions may occur including unusual types of skin eruptions, involvement of joints, and leukocytosis. Hepatitis, thrombocytopenic purpura, and agranulocytosis due to drugs may also be allergic symptoms. Such histologic lesions as arteritis, focal necrosis, and granuloma formation may also result from drug sensitization.

Scratch and intracutaneous tests are of value in detecting allergy to protein drugs, but are rarely of value and may produce dangerous general reactions in cases of sensitization to non-protein compounds. Patch tests are fre-

quently of value in dermatitis due to drug allergy. Although desensitization is of value in reaction to protein drugs, its efficacy in sensitization to non-protein drugs is rather questionable.

W. B. S.

CHRONIC CORONARY DISEASE

To make the patient live longer, and to offer him a "friendly life," should constitute the primary objectives in the management, treatment, and therapy of chronic coronary insufficiency. That these objectives are mutually complementary, was stressed in a recent discussion of the problem by Dr. Robert S. Berghoff.

For the most part, chronic coronary disease is a result of arteriosclerosis, and might, in fact, be termed chronic arteriosclerotic coronary disease. Before making this diagnosis, however, it is necessary first to rule out the possibility of the condition being of syphilitic origin. However, syphilitic heart disease is rapidly disappearing.

Although the disease, which is generally progressive, may occur at any age, it usually affects the patient at approximately the halfway point of his life. In many patients, the symptom complex begins as angina of effort, followed by acute occlusion with infarction, and finally chronic coronary insufficiency.

In order to achieve the principal objective of prolonging the patient's life, it is necessary to evaluate each individual's energy potential in terms of his physical, mental, and emotional capacities.

It is, of course, necessary for the physician to assist the patient in making whatever readjustments are required of him and to help him plan a revised way of life. Depending on the amount and type of insufficiency present, some change in the patient's occupation may be involved. His work may have to be of a more sedentary nature, and if the previous employment has required much physical effort, this will obviously have to be eliminated. Almost as important as the expenditure of physical effort is that of mental energy. The patient must channel his mental "expenditures," so as to keep them within his mental output potential—in other words, he must stop short of pain, distress, and fatigue.

As a corollary to avoiding all mental strain, the patient must also learn to control his emotional reactions. He must develop a sense of lethargy toward relatively unimportant factors—to avoid or minimize situations leading to emotional disturbances.

In the matter of personal habits, Dr. Berghoff believes that the wisest course to follow is not to compel the patient to institute drastic changes. For example, if a patient has been accustomed to the *moderate* use of tobacco and alcohol, he will probably not be further harmed by their continued use, although some reduction in consumption may be indicated. In many instances, it has, in fact, been found that allowing the patient to live "normally" as much as is consistent with his individual condition, has had beneficial effects rather than otherwise. Whether this procedure can be followed is, of course, a matter which must be determined for each patient individually.

Unless the patient is nephritic, diabetic, or obese, no stringent dietary measures need be introduced. The most important factor in regulating the diet is the quantity of food consumed—the quality of the food is not so vital so long as the diet is well balanced. Overloading the stomach must be avoided and particularly before retiring.

In addition to observing these principles, the patient must devote ample time to complete relaxation and sleep. A minimum of ten hours of rest at night, and an hour in the afternoon is advised.

One factor in many patients' pattern of living which Dr. Berghoff feels has too often been neglected, but which is extremely important, is the continuance of sexual intercourse. Here again, it is difficult to generalize; what to tell the patient must be decided on the basis of the individual case situation. Sexual intercourse

naturally offers a hazard since it induces an emotional peak. The patient himself must judge whether he is too fatigued by the experience—if that "normal act" causes progressively increasing symptoms of dyspnea, then it is dangerous and should be discontinued.

Along with a carefully planned program of living, some consideration should also be given to the use of therapeutic agents when necessary. For sedative purposes, therapy may comprise ¼ grain of phenobarbital four times a day. If such coronary dilators as aminophylline, papaverine, or theobromine are used, the dosage should be about 3 grains a day, orally. Nitroglycerin may be used to control pain, and also for treatment of hypertensive patients.

Although there are no positive indications that the administration of vitamins is of direct benefit in the treatment of chronic coronary insufficiency, they do indirectly boost the patient's vitality—particularly thiamine chloride.

If frank heart muscle decompensation is present, especially of the right heart, digitalis, in a small dose over a long period of time, is of value. The drug is not very effective for left heart muscle decompensation.

By following such a comprehensive program of management, treatment and therapy, the average patient suffering from chronic coronary insufficiency can maintain a comparatively normal and useful life—always remembering that "moderation" is *his* norm and the underlying precept of the physician's directives. In addition to a normal and useful life, such a patient with chronic coronary insufficiency will find life friendly and worth while.

A. E.

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William Worrall Mayo

"I Started All This"

J. L. BURN*

CITY OF SALFORD, LANCS., ENGLAND

I LIVE and work in the birthplace of William Worrall Mayo who is so rightly revered as a pioneer in the great days of the nineteenth century. American readers will well remember the colorful events of his life; how, as a physician in Minnesota, he carried out his duties against the primitive background of covered wagons, and how he helped to check the advance of the Sioux Indians during the Minnesota Massacres of 1862, whilst his wife was organizing a stage army of women to make a display of force.

One hundred and three years ago he impulsively emigrated to America. Before his death in 1911, he had seen his sons, William and Charles, rise to medical eminence and international fame in the very village in which the father practiced. His sense of humor is seen in the reply he was wont to give to those who made reference to the brilliance of his sons. "Why don't you congratulate me? I started all this!" was his dry reply.

The official biography "The Doctors Mayo"[1] gives Eccles, Lancashire, as his birthplace, but I am proud to claim the adjoining City of Salford for this honor. The mistake probably has arisen in that the house in which he was born was situated in the *ecclesiastical parish* of Eccles, to the Parish Church of which he was taken for baptism. Ecclesiastical and local government boundaries frequently differed. It may seem of little moment to some readers as to where precisely he was born; but to us in the City of Salford it is important. He was certainly born in Salford; the entry in the ecclesiastical register says so. For the first time, it is reproduced here.

Another interesting fact which the entry in the ecclesiastical register brings to light for the first time, is that William Worrall Mayo's father, James Mayo, was a joiner. "The Doctors Mayo," Bibliographical Notes, p. 722, records that "Mrs. Berkman (to Richard O. Beard) said she thought that James Mayo had been a farmer, but according to William J. Mayo (story to Mrs. Mellish), he followed the sea as a ship's captain." The register entry is of interest, therefore, in revealing that, at the time the entry was made, William Worrall's father was a joiner.

William Worrall may well have acquired his manual dexterity from his father, who would be a craftsman accustomed to manipulations. There is, therefore, a link between craftsmanship of father and son—one a joiner and the other a surgeon to whom, in the days before the use of anesthetics became general, manual dexterity would be of great importance.

There is a curiously long interval between his birth (May 31st) and his baptism (October 24th). It was then the general custom to have babies christened within a month after birth. The reason for the deviation from custom is unknown; it could not have been that he was very delicate at birth for christening would have taken place then, as now, immediately.

Another point of interest in the ecclesiastical register entry is the way in which his mother's name is spelled. In the register it is spelled "Anne"; in the official biography "The Doctors Mayo" it is spelled "Ann."

There is no certainty as to where William Worrall was born. Two houses are possibilities. There are traces of a family of Mayos, in good social circumstances, having resided at New Barns, a part of Salford (although previously in the ecclesiastical parish of Eccles). The house would have been demolished when the Manchester Ship Canal was made, over fifty years ago. There were many Mayos and an old calendar of 1831 lists twelve families of the name of Mayo living in different parts of the town.

Buried in Eccles churchyard are several Mayos who lived at the end of the eighteenth and beginning of the nineteenth century. One, James Mayo, said to be of Ardwick (a district of Manchester) and his wife Anne Mayo (the same names as the father and mother of William Worrall) died in 1822 and 1839 respectively; but it is not likely that they were the parents of William Worrall. I believe the birthplace of William Worrall to be near Oldfield Road, Salford. On a visit to the house I found it to be infested with bugs! I hastily got it disinfected in case of any visitors!

Atkinson, "Biographical Dictionary," p. 602, states

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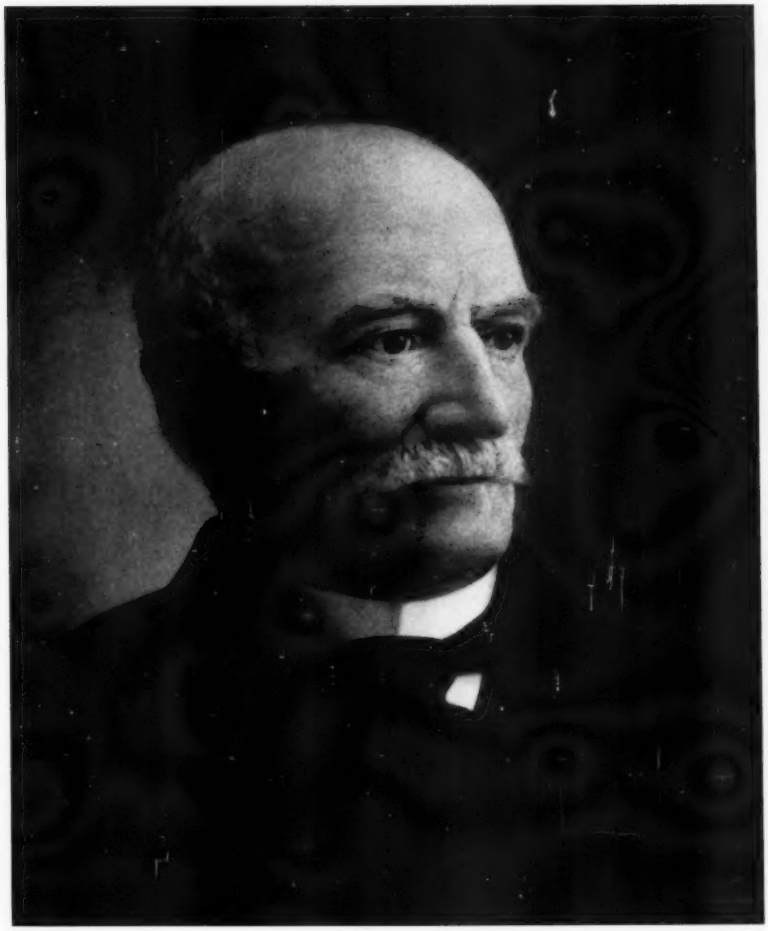


WILLIAM WORRALL MAYO

that the Mayo family had lived for generations at "New Barns," but for William's birthplace gives only "near Manchester." Mrs. Berkman, who copied the birth record from the flyleaf of the prayer book given her by a cousin when she was visiting in Eccles in 1929, wrote (letter to Richard O. Beard, July 1, 1935, Press file) that James Mayo lived at Old Barns but that William Worrall was born at "Old Field's Road," Salford.

In the prayer book she found also a slip of paper bearing the words: "Feb. 6th 1785. Baptized Ann, daughter of John and Tenneson Bonselle. H. C. Smith, curate of Monyark."

Near the Mayo cottage lived Edmund Taylor (of great local fame) who was a pioneer of surgery and bonesetting, and it is tempting to think that William Worrall Mayo's choice of work, and the eminence of the next generation of Mayos in it, owe something to the influence of Dr. Taylor.

THE MAYO MEMORIAL WINDOW

I am glad to be able to report on the excellent condition of the stained glass window erected in Eccles Parish Church in 1929 when the Mayo brothers visited this church. (Incidentally, their visit to England together was of interest in that it was the first occasion upon which they had both been away from the Clinic; previ-

Stained glass windows in Eccles Parish Church, erected in 1929.

ous to that there was always one or the other of the brothers in attendance there.) The beauty of this west window shows up best when illumined by bright sunlight or a sunset glow. The inscription on the window reads as follows:

"TO THE GLORY OF GOD & in memory of William Worrell Mayo of Rochester, Minnesota, United States of America. Born in Eccles May 31st 1819. Died at Rochester March 6th 1911. He was a Pioneer, Physician, Citizen; a man of hope, vision and achievement. This window is placed here by his sons William James & Charles Horace Mayo."

(The name Worrall has frequently been recorded wrongly; for example, it will be noticed that it has been recorded in the above-quoted inscription as "Worrell.")

The window's emblematic stained-glass figures and designs typify his life and achievements. The pelican, the symbol of self-sacrifice, is in the foundation of the center light and is thus the root from which the other emblems spring. Above are saints who were doctors and martyrs, and gave their lives for the benefit of humanity.

The traceries are filled with coats of arms and demi-figures of saints. At the left is the coat of arms of Saint Christopher, the patron of travellers, chosen as a symbol of Dr. Mayo's early pioneering life. Next are Saints William of Rochester, and Charles of Borromeo, patron saints of Doctors William and Charles Mayo. Saint George, patron of England and soldiers, calls to mind martial qualities. The shield of Saint George of England, together with the coat of arms of the See of Manchester identifies the position of the church.

Saints Joan of Arc, and the Blessed Louise are in remembrance of the doctor's wife. The doctor's wife's name was Louise, so that the Blessed Louise, Sister of Charity, is depicted as her patron. Saint Joan is shown to signify her bravery in facing the perils of pioneering, dressing in men's clothing and fighting the Red Indians by her husband's side. The coat of arms of Saint Nicholas, the patron of sailors, alludes to William Worrall Mayo's emigration over the Atlantic when that voyage was hazardous.

The top of the traceries contains the figures of Saint Francis of Assissi and the Blessed Virgin Mary. St. Francis is offering the Blessed Virgin the hospital of Saint Mary, Rochester, and allusion to the founding of that hospital by the doctor at the suggestion of the Mother Superior of the Convent of Saint Francis. Hence at the top of the window is a final link between the hospital that he helped found and the parish church where he was baptized, both being under the patronage of Saint Mary the Virgin.

Dr. and Mrs. W. W. Mayo with Sarah, Phoebe and Gertrude.

(From "The Doctors Mayo," by Helen Clapesattle. © University of Minnesota Press, 1941.)

HIS MEDICAL TRAINING

Regarding the medical training in England of William Worrall Mayo, I cannot speak in the definite terms of the official biography. A search of the records of attendance at the Manchester Royal Infirmary, which was a great institution even in those days, does not show any trace of William Worrall's attendance. He most probably attended the Manchester School of Medicine, founded in 1822, at Pine Street, off Piccadilly, by Thomas Turner, F.R.C.S. (1793-1873). John Dalton lectured there for a number of sessions in 1825 to 1826. In 1836 the school was recognized officially as the Manchester Royal School of Medicine. He could not have attended Owen's College (as stated in more than one American biography) for this college was not opened until 1851, six years after he had emigrated.

John Dalton, the father of the atomic theory, taught at Pine Street in 1825 and 1826 and probably in later years. In 1837 (when William Worrall was 17) he had a paralytic seizure and probably never taught again; so that if William Worrall did have lessons from John Dalton it would be in his early life. Of course John Dalton was a celebrated figure and William Worrall would almost certainly have known of him.

An unsigned manuscript, "The Mayo Family," dated August, 1929 (Press file), which seems to have emanated from the Mayo Clinic and which bears corrections and additions in Dr. W. J. Mayo's characteristic hand, contains the statement that W. W. Mayo went to England in 1849 and 1850 to study with the chemist Frankland. The vague memory of the name of Frankland and of a foundation school, upon which the manuscript's statement was undoubtedly based, lends credence to the contention that it was the Nonconformist Manchester New College which W. W. Mayo attended, because an academy founded there by one Richard Frankland was the "foundation school" for New College (Manchester College, Oxford, Prospectus, 1938, 1. 6).[1]

Some valuable records which might have thrown light on John Dalton and perhaps on William Worrall Mayo as a young student were destroyed when the Literary Philosophical Society buildings were demolished in the 1940 blitz. Unfortunately the nineteenth century records of my Health Department suffered a similar fate, so the seeker for historical truth is certainly handicapped.

A SON OF SALFORD

Salford is proud of the fact that she can claim William Worrall Mayo as one of her sons. The Mayo Clinic, founded by his two eminent sons, is one of the glories of world medicine. When we look at that edifice and ponder on the life work of William James and Charles Horace Mayo, we are glad to think that here in Salford we live and work in the place where was born, and spent the formative years of his life, the man who quite rightly said, "I started all this!"

REFERENCE

1. Clapesattle, Helen: The Doctors Mayo. University of Minnesota Press, Minneapolis, 1941.

Consultation Service

This special consultation information service is offered as a regular monthly feature of *Postgraduate Medicine*. Readers are invited to call on this Service for answers to difficult medical problems from members of our Editorial Board best qualified to help. Each question will be answered by mail and those of general interest will be published each month. Address all communications to Consultation Service, *Postgraduate Medicine*, 516 Essex Building, Minneapolis 3, Minnesota.

PERNICIOUS ANEMIA OF PREGNANCY

QUESTION: I have a patient, five months pregnant, who has pernicious anemia of pregnancy. She fails to respond to parenteral injections of liver extract. What do you advise?

M.D.—California

ANSWER: The first and most essential point to establish is that the patient actually has pernicious anemia complicated by pregnancy. This may be the so-called pernicious anemia of pregnancy which resembles true pernicious anemia, is probably due to dietetic deficiencies, and tends to recover almost spontaneously with the ending of pregnancy, without sequelae.

The December 1948 issue of *Obstetrical and Gynecological Survey* (pp. 792-795) has a worthwhile discussion of etiology, diagnosis, and treatment based on two papers, one by L. S. P. Davidson and colleagues, the other by M. Gillespie and a coworker, both from a recent issue of the *British Medical Journal*.

It is agreed that patients who do not respond to parenteral liver therapy will do so to oral administration of proteolized or of cooked liver.

Folic acid seems to be the best agent available at present for treatment of pernicious anemia of pregnancy. Its action is rapid and definite, improvement in the blood picture and in clinical symptoms usually following promptly.

PAUL TITUS

RINGWORM INFECTION

QUESTION: What treatment can be used for ringworm infection of the feet and scalp where the patient must go to work daily?

M.D.—Washington

ANSWER: Work is not a contraindication to treatment of either ringworm of the feet or scalp. The newer remedies for ringworm of the feet, as undecylenic, propionic, and caprylic acids, compounded in salves, liquids, or powders, are not irritants and have a very low sensitizing index. These are moderately effective in ringworm of the feet caused by either Trichophyton gypseum or Epidermophyton inguinale. However, the less inflammatory and more recalcitrant infections, caused by Trichophyton purpureum, are resistant to almost all therapy including strong keratolytic agents, chrysarobin, etc.

Ringworm of the scalp when caused by fungi of animal origin, as Microsporum lanosum and Trichophyton gypseum, respond to local therapy. Among the best of the newer remedies are 5 per cent salicylanilide in carbowax 1500 and 5 to 10 per cent copper undecylenate in the same base.

Ringworm of the scalp when caused by Microsporum audouini, Trichophyton violaceum, Trichophyton sulphureum, etc., are extremely resistant to local therapy and are best treated by epilation with x-ray. A limited number of ringworm infections of the scalp caused by the latter group of organisms have been cured by persistent local therapy and manual epilation.

BEDFORD SHELMIRE

PENICILLIN FOR RHEUMATIC FEVER

QUESTION: Has penicillin proved effective in treating acute rheumatic fever? If so, what dosages are recommended? Are there any deleterious effects from its use?

M.D.—Minnesota

ANSWER: Penicillin in my experience and in the experience of most physicians who treat rheumatic fever has no curative or beneficial effect on the disease. There are no deleterious effects from the use of the drug in this disease other than those which might occur from its use in any other disease, such as allergic phenomena, etc.

JAMES E. PAULLIN

ULCERATIVE COLITIS

QUESTION: Will you please send me some information on the therapy of nonspecific ulcerative colitis, and in particular, anything you might have concerning the use of desiccated hog stomach in this disease along with dosage advisable.

M.D.—Wisconsin

ANSWER: The most important detail to be established before a patient who has ulcerative colitis is treated is a determination of the cause of the condition, or if this is not possible, at least classification of it. A great variety of therapeutic measures have been employed in the treatment of the various forms of ulcerative colitis.

The diet should be high in proteins, vitamins, and calories, and low in residue. Among the sulfonamides which have been proved to be of value are sulfaguanidine, sulfasuxidine, sulfathaladine, and neoprontosil. For the very sick patient, penicillin in large amounts has been particularly helpful. The transfusion of blood commonly is required.

"Desiccated hog stomach," which has been considerably discussed lately, has very doubtful value.

DIFFERENTIAL DIAGNOSIS OF ACUTE APPENDICITIS AND RENAL COLIC

QUESTION: What symptoms and signs will aid in the differential diagnosis of acute appendicitis and renal colic?
M.D.—North Dakota

ANSWER: The most characteristic story of acute appendicitis begins as a feeling of heaviness or weight in the epigastrium or umbilical area followed by generalized discomfort which becomes localized in the right lower quadrant. It is usually followed by nausea and at times vomiting on one or two occasions.

Right sided renal colic rarely has this diffuse character but may be localized to the right lower quadrant. Usually, the pain begins in the back and radiates down through the right side, many times going into the groin. Nausea may occur but rarely vomiting.

The point of greatest value in differentiating the two conditions is demonstrating point tenderness. With appendicitis, this is usually found in the classical position, irrespective of the position of the appendix and can be demonstrated at McBurney's point. With a pelvic appendix, point tenderness may be demonstrated on the right side by vaginal or rectal examination. The presence or absence of fever, or elevation of the leukocyte count will be of little help in differentiating the two conditions.

Usually in the presence of renal colic, examination of the urinary sediment will show occasional red blood cells and a few pus cells. A flat plate of the abdomen in doubtful cases may occasionally reveal a shadow along the course of the ureter. The examination of patients in the hospital gives an opportunity for cystoscopic examination, when the differential diagnosis is unusually difficult.

RICHARD B. CATTELL

BELL'S PALSY

QUESTION: I would appreciate information relative to therapy for Bell's palsy with comments on the use of "Aureomycin," and superficial x-ray especially. If etiology is a suspected virus infection, what incubation period might one expect, and what (other) proved etiologic agents are implicated?
M.D.—Windsor, Ontario

ANSWER: Bell's palsy, in the broadest sense, refers to paralysis of the muscles supplied by the seventh cranial nerve by a pathologic process affecting the nerve itself. The seventh cranial nerve is particularly susceptible because of its long course within a bony canal. Other nerves may become edematous without significant dysfunction developing; the seventh cannot to more than a slight degree without interruption of its function as a result of pressure.

The commonest cause of Bell's palsy seems to be in response to exposure of the side of the head to cold air, so-called refrigeration palsy. Inflammations of the nerve, such as may occur in otitis media, Guillain-Barré's syndrome, sarcoidosis, meningo-encephalitis, and Hunt's syndrome (herpes zoster oticus) are more common than tumors of the nerve. Of course, fracture through the petrous portion of the temporal bone and direct injury during mastoid surgery are not uncommon causes of peripheral facial paralysis.

Thus, it is seen that virus infection is probably an uncommon cause of Bell's palsy. The treatment varies as the etiology varies. Fortunately, in the commonest types resulting from refrigeration, recovery is the rule in a few weeks. In the more severe cases where degeneration of the nerve takes place, regeneration results in fairly satisfactory recovery after six months. In such cases massage and galvanic stimulation of the paralyzed muscles is the treatment of choice. If regeneration does not occur an anastomosis between the spinal accessory and the facial nerve or one of the plastic operations to correct deformity is indicated.

"There is no experimental or clinical evidence to date to indicate that aureomycin is of any value in the treatment of this condition."

TREATMENT OF PNEUMONIA IN CHILDREN

QUESTION: In what form and dosage should penicillin be given in treating lobar and bronchopneumonia in children?
M.D.—Kansas

ANSWER: We prefer aqueous penicillin G given in doses of 100,000 units every eight hours or every twelve hours by the intramuscular route.

TREATMENT OF SPASMODIC CROUP

QUESTION: By what means can spasmodic croup in children under 6 years be relieved most promptly? Has adrenalin been used effectively? In what dosage?
M.D.—Wyoming

ANSWER: Increasing the humidity of the room of the child with spasmodic croup is the best immediate way to relieve the distress. The addition of sedatives, such as phenobarbital, is also indicated. Adrenalin has been used, and is said to be effective in doses of 2 to 3 minims.

TWITCHING EYELID

QUESTION: What physical conditions should be looked for in a case of twitching eyelid when all examinations of the eye prove negative?
M.D.—Michigan

ANSWER: A twitching eyelid is never a sign of a purely ocular condition. It is evidence of general fatigue, toxemia, or a focus of infection some place. An infected tooth is often to blame. Garage workers who inhale small amounts of carbon monoxide often show this symptom. It has also been observed following, on occasion, encephalitis lethargica. In some rare instances it is evidence of a psychiatric disturbance.

DERRICK VAIL

New Drugs and Instruments

Information published in this department has been supplied by the manufacturers of the products described.

VEAL BONE ASH TABLETS

PURPOSE: To supply calcium and phosphorus derived from a natural source.

COMPOSITION: Each tablet contains 0.27 gm. of veal bone ash and supplies 0.1 gm. of calcium and 0.05 gm. of phosphorus.

INDICATIONS FOR USE: For supplementation of diets deficient in calcium and phosphorus; for supplying added calcium and phosphorus during pregnancy and lactation; and for various disease states where the need for an increased calcium and phosphorus intake exists.

DOSAGE AND ADMINISTRATION: Usual dosage for supplementation of the adult diet deficient in calcium and phosphorus is 5 to 10 tablets daily. Suggested dosage for the latter half of pregnancy and for lactation is 10 to 15 tablets daily. The dosage for patients with various disease states depends upon the condition in question and should be determined by the physician in accordance with the clinical needs.

HOW SUPPLIED: Mead's Veal Bone Ash Tablets are supplied in bottles of 250 tablets.

PRODUCER: Mead Johnson & Company, Evansville 21, Ind.

LAURIUM

PURPOSE: Oral hematinic.

COMPOSITION: Each capsule contains: 280 mg. ferrous gluconate; 200 mg. liver concentrate, derived from 4 gm. fresh mammalian liver; 1 mg. folic acid; 2 mg. thiamine hydrochloride; 1 mg. riboflavin; 10 mg. niacinamide; and 15 mg. ascorbic acid.

INDICATIONS FOR USE: Prophylaxis and therapy of nutritional, hypochromic and secondary anemias; adjunctive therapy in macrocytic anemias; and in avitaminoses of the B complex and ascorbic acid often accompanying anemias. Not intended for treatment of pernicious anemia.

DOSAGE AND ADMINISTRATION: Administration with meals suggested. Dietary supplement—1 or 2 capsules daily. Hypochromic anemia—1 or 2 capsules three times daily or as physician directs.

HOW SUPPLIED: Bottles of 100 capsules.

PRODUCER: Whittier Laboratories, Division Nutrition Research Laboratories, Chicago 30, Ill.

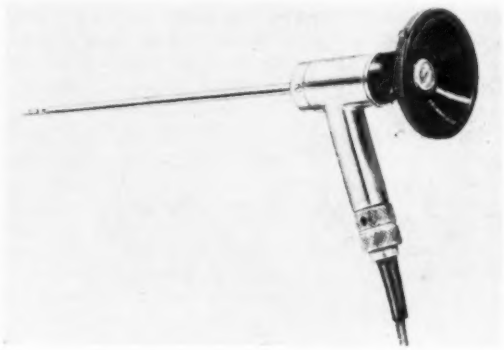
OXYCEL FOLEY CONES

DESCRIPTION: Absorbable, hemostatic, oxidized cellulose in gauze form, in four-ply discs, folded into cones.

INDICATIONS FOR USE: Designed for use in conjunction with the Foley hemostatic bag catheter in suprapubic or retropubic prostatectomy. They assume a conical shape readily adaptable to placement in the prostatic fossa. May be left in the body cavity following operation without irritation or impairment of healing processes.

HOW SUPPLIED: In 5 inch and 7 inch diameters, each in individual glass containers.

PRODUCER: Parke, Davis & Company, Detroit 32, Mich.



NASOPHARYNGOSCOPE

PURPOSE: Visual inspection of eustachian orifices, the nasal floor, mucous membranes, blood vessels, posterior portions of the turbinates, and posterior pharyngeal wall.

DESCRIPTION: An illuminated endoscopic instrument 11 Fr. incorporating a freely rotatable lens system with right angle, highly magnified field. All optical elements have antireflection coatings. Cartridge type lamp, without screw threads avoids need for alignment of lamp with objective lens. Lamp is encased in an unbreakable transparent capsule which presents a cool surface to mucous membranes. Supplied with flashlight cell battery handle or with switch cord for operation on standard low voltage controllers.

PRODUCER: National Electric Instrument Co., Inc., Elmhurst, L. I., N. Y.

AD-VITUM DROPS

PURPOSE: Water soluble, liquid vitamin preparation.

COMPOSITION: Ad-Vitum Drops contain distilled vitamin A ester, viosterol in oil, sorbitan fatty acid ester derivative, vegetable oil, and glycerin in a flavored aqueous vehicle. Each cc. contains:

Vitamin A	30,000 U.S.P. units
Vitamin D	5,000 U.S.P. units

INDICATIONS FOR USE: Periods of active growth, development or repair of tissues, in chronic gastrointestinal disorders, restricted therapeutic diets, and conditions with increased metabolism.

DOSAGE AND ADMINISTRATION: Infants and children under 12: 3 to 5 drops. Adults and children over 12: 4 to 6 drops. Larger doses may be adjusted to individual requirements. Ad-Vitum Drops may be added to milk, fruit juices, or infants' formulas or dropped directly on the tongue.

HOW SUPPLIED: In bottles of 30 cc.

PRODUCER: International Vitamin Division, Ives-Cameron Company, Inc., New York 16, N. Y.

NYLON SYRINGE CASES

DESCRIPTION: Fountain-pen-shaped cases for hypodermic syringes. The larger case holds the 5 cc. syringe, the smaller case holds any hypodermic needle up to 2 inches in length. The syringe and needles can be sterilized, or even autoclaved, right in the cases by merely loosening the cap, thus exposing a slot which admits the steam.

PRODUCER: The Menda Co., Pasadena, Calif.

PABALATE

PURPOSE: Antirheumatic.

COMPOSITION: Each Pabalate tablet, coated to prevent gastric irritation, contains:

Sodium salicylate, U.S.P. (5 gr.)	0.3 gm.
Para-aminobenzoic acid (5 gr.) (as the sodium salt, N.N.R.)	0.3 gm.

DESCRIPTION: Pabalate furnishes two active antirheumatic agents which act synergistically to result in higher and adequate salicylate titer and with a proportionate reduction in risk of salicylism (since lower salicylate dosage is possible).

DOSAGE AND ADMINISTRATION: Rheumatoid arthritis—During acute exacerbations or when the severity of the pain indicates bed rest, 2 Pabalate tablets three or more times a day are indicated. At other times the patient can adjust the dosage to his needs. Acute rheumatic fever—The adult dosage should be 2 Pabalate tablets six to eight times a day until definite improvement is noted, after which the dosage can be reduced somewhat, e.g., 2 tablets three or four times a day. This schedule should be continued without interruption until all signs of active infection have been absent for seven to ten days.

HOW SUPPLIED: In bottles of 100 tablets.

PRODUCER: A. H. Robins Co., Inc., Richmond, Va.

DIAZOLINE TABLETS, GROOVED
DIAZOLINE DULCET TABLETS

PURPOSE: Compound of sulfadiazine and sulfathiazole.

COMPOSITION: Diazoline Tablets, Grooved, contain 0.25 gm. sulfadiazine and 0.25 gm. sulfathiazole. Diazoline Dulcet Tablets, yellow and fruit-flavored, contain 0.15 gm. sulfadiazine and 0.15 gm. sulfathiazole in a medicated candy dosage form.

INDICATIONS FOR USE: May be administered orally in the treatment of any case of acute bacterial infection in which either sulfadiazine or sulfathiazole is specifically indicated, with the exception of meningitis.

CAUTIONS: Diazoline is contraindicated in cases of infections caused by organisms that are not susceptible to sulfathiazole or sulfadiazine. Diazoline Tablets should be carefully administered, observing the same precautions that are recommended for the use of sulfonamide drugs in any other form.

DOSAGE AND ADMINISTRATION: Recommended dosage is equivalent to that of either drug when given alone. In adults an adequate sulfonamide concentration in the blood may be achieved by an initial dose of 4 to 6 gm. and maintained by further doses of 1 gm. every four hours, using either the Tablet or the Dulcet Tablet.

HOW SUPPLIED: Diazoline Tablets, Grooved, are supplied in bottles of 100 and 1,000. Diazoline Dulcet Tablets are supplied in bottles of 100.

PRODUCER: Abbott Laboratories, North Chicago, Ill.

CHOLIMETH

PURPOSE: A lipotropic agent for the treatment of liver disorders.

COMPOSITION: Each tablet contains:

Choline dihydrogen citrate	0.350 gm.
d, l-methionine	0.167 gm.

INDICATIONS FOR USE: Hepatic damage whether of dietary or toxic origin. Cirrhosis of the liver, liver dysfunction where fatty degeneration is threatened. Toxic hepatitis resulting from drug or industrial substances. Icterus gravis neonatorum. Dermatologic disorders associated with choline deficiency.

DOSAGE AND ADMINISTRATION: Average recommended dose is 2 gm. daily of choline and methionine (12 tablets of Cholimeth per day in divided doses). Dosage as high as 3 or 4 times the average dosage has been used in many cases.

HOW SUPPLIED: Uncoated tablets, bottles of 100, 500, and 1,000.

PRODUCER: The Central Pharmacal Company, Seymour, Ind.

TRACTACLIP*

PURPOSE: Wound approximator designed to exert gentle continuous traction on the edges of skin wounds. Formerly known as the Constant Traction Dressing.

DESCRIPTION: Traction is supplied by a sheet of latex connecting two metal members which grip the skin by means of fine-toothed edges.

INDICATIONS FOR USE: Most applicable to relatively flat surfaces where the skin is not loose or redundant. Useful in treatment of industrial injury, emergency surgery, and in plastic surgery of the face and head where indicated.

HOW SUPPLIED: Tractaclips are sterilized and packed individually. Available in three sizes: No. 95—¼ inch spread, 1 inch wide; No. 96—½ inch spread, 1 inch wide; and No. 97—¼ inch spread, ½inch wide.

PRODUCER: Davis & Geck, Inc., Brooklyn 1, N.Y.

*Registered Trade Mark.

GRAMODERM

PURPOSE: Antibiotic skin ointment.

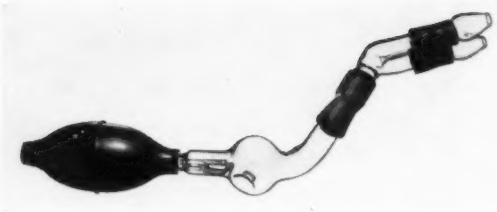
COMPOSITION: Each gram of Gramoderm contains 0.25 mg. of gramicidin.

INDICATIONS FOR USE: Treatment of skin infections due to gram-positive organisms, such as impetigo eczematodes, impetigo contagiosa, ecthyma, and infected superficial wounds caused by susceptible organisms.

DOSAGE AND ADMINISTRATION: Gramoderm is liberally applied to the infected areas and covered with an occlusive dressing. The dressing is renewed every twelve hours.

HOW SUPPLIED: Collapsible tubes containing 20 gm.

PRODUCER: Schering Corporation, Bloomfield, N.J.



PEN-I-MIST HAND BULB NEBULIZER

PURPOSE: Penicillin aerosol treatments.

DESCRIPTION: Utilizes soluble tablets of crystalline penicillin or standard crystalline salt. Tablet is dropped into nebulizer and diluent is added, usually about 8 drops of water or saline. When vials are used, standard syringe procedure or penicillin solution is used. Complete instructions are enclosed with each Pen-i-mist.

PRODUCER: Oxygen Therapy Sales Co., Los Angeles 27, Calif.

VI-SYNERAL INJECTABLE

PURPOSE: Treatment of vitamin deficiencies.

COMPOSITION: Each 2 cc. of Vi-Syneral Injectable contains, in aqueous solution:

Vitamin A	10,000 U.S.P. units
Vitamin D (calciferol)	1,000 U.S.P. units
Thiamine HCl (B_1)	10 mg.
Riboflavin (B_2)	1 mg.
Pyridoxine HCl (B_6)	3 mg.
Niacinamide	20 mg.
Ascorbic acid (C)	50 mg.
Alpha Tocopherol (E)	2 mg.

INDICATIONS FOR USE: For prevention and treatment of vitamin deficiencies in all conditions in which gastrointestinal digestion, absorption, or utilization is impaired; patients unable to take vitamins or food by mouth; patients so acutely deficient that delay of intestinal absorption must be prevented; patients critically ill with nutritive failure. Such conditions include diarrhea, sprue, colitis, intestinal fistula, obstructive intestinal lesions; following intestinal resection.

ADMINISTRATION: The contents of one ampule (2 cc.) is administered intramuscularly on alternate days or more frequently as necessary. Inject *slowly* in the gluteal muscle or deep in the outer aspect of the thigh, changing the site for each injection.

HOW SUPPLIED: 2 cc. ampules, boxes of 6, 25, 100, and 500.

PRODUCER: U.S. Vitamin Corporation, New York 17, N.Y.

LOZILLES

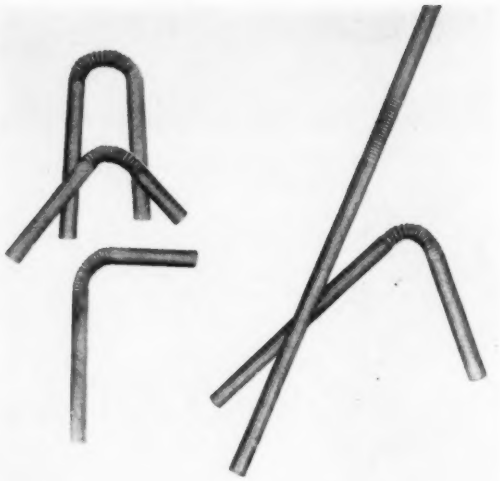
PURPOSE: Antibiotic, analgesic throat lozenge.

COMPOSITION: Each Lozille provides 2 mg. of tyrothricin and 2 mg. of propesin.

INDICATIONS FOR USE: In treatment of common infections of mouth and throat, for relief of sore throat and prevention of secondary infection during the common cold, and relief of pain and reduction of oral bacterial flora following oral surgery.

HOW SUPPLIED: In vials of 15 tablets.

PRODUCER: White Laboratories, Inc., Newark 7, N.J.



FLEX-STRAW

DESCRIPTION: Disposable drinking tube, specially treated for use in hot as well as cold liquids. The crimped section near the top allows the straw to flex and bend to any drinking angle.

PRODUCER: The Flex-Straw Corporation, Cleveland 3, Ohio.

PYRIBENZAMINE EXPECTORANT WITH EPHEDRINE

COMPOSITION: A mixture containing per 4 cc. 30 mg. pyribenzamine citrate, 10 mg. ephedrine sulphate, and 80 mg. ammonium chloride.

INDICATIONS FOR USE: In persistent unproductive cough accompanying bronchitis due to or associated with allergy; in asthma, and in cases of upper respiratory infection associated with allergy.

DOSAGE AND ADMINISTRATION: Orally, one or two teaspoonfuls every three to four hours. A full glass of water should be taken with each dose.

HOW SUPPLIED: Bottles of 1 pint and 1 gallon.

PRODUCER: Ciba Pharmaceutical Products, Inc., Summit, N.J.

BREONEX-L (SOLUBLE)

PURPOSE: A potent stable powder containing the principal B complex factors.

DESCRIPTION: Instantly soluble, the restored solution may be used parenterally in whatever dosage the physician may choose. It can be stored indefinitely in a dry state without refrigeration. It is stable in solution for at least two weeks, and its special double salt permits heavy grainage of riboflavin.

HOW SUPPLIED: In rubber-capped vials, with a 10-cc. vial of aqueous diluent.

PRODUCER: George A. Breon and Company, Kansas City, Mo.

Leaves from a Doctor's Diary

By Maurice Chideckel

March 2 . . . I don't know which was of more absorbing interest, the discussion around a table by well known otologists about the intravenous administration of histamine in sudden nerve deafness, or the waiters and the customers in that crowded, odd-looking, exotic eating place, situated in the woods, where they spoke a language I did not understand.

"Ordinarily," said Professor D., "such cases would be classed as labyrinthine apoplexies, caused by hemorrhage into the labyrinthe, or because of edema in the cochlear portion of the labyrinthe. . . ."

Dr. Gilford interrupted: "I think it is due to thrombosis of the auditory nerve pressure being exerted on the organ of Corti. . . ."

Somehow I didn't care to hear shop talk any longer for today. For the study of psychology—I mean

abnormal—the customers and the waiters were more amusing and far more interesting. I watched the men as they ran in, gobbled up the food and ran out to earn money for more food. An old man ate his soup and it sounded like a loud saxophone. He put the spoon away, and began to empty the contents from the plate. Suddenly he arose and angrily thumped his fist on the little table. . . .

"I see your redheaded waitress is here no longer. The hair in the soup today is black." "Quick, a turkey sandwich," came from a young man with a fancy vest. The waiter looked typically Russian. "Have no turkey," he informed the customer. "Then give me a chicken sandwich," came the order. The waiter grinned. "Foolish man," he said. "If I had chicken, wouldn't I give you turkey?" A man drank a cup of coffee, put down a two dollar bill. The waiter came back with his hands behind him. "Mister," he said, "there is $1.95 change. Do you want it?"

I love to watch people in crowded places, observe their actions and see the expressions of some faces. There you see the dance of life without a backdrop. There you see man equipped with instinct, with diverse tensions and adaptability, but mainly with the ego. If they only knew. I went outside, for the argument at the otology table was becoming too hot. A boy about seven, sickly looking, pulled at my sleeve. He was crying. "Mister, I lost my dime, and I can't get in the movie." "Why do you go to the movies? Why don't you go to school?" I asked him. "Can't," he answered, "got the measles."

* * *

March 3 . . . From elderly Bob Coughey: "They say penicillin cures gonorrhea? Yes? Then give me a shot, but a strong one. Yes. I got it all right, got it for practicing Christianity. A good Christian is to love his neighbor; that includes the neighbor's wife, doesn't it? Who would ever suspect that woman, innocent looking, is an immoral creature. What a crooked world."

Read a question in a medical journal: Does long travel increase the risk of miscarriage? Well, if it is in an automobile and at night, it may eventually lead to one.

March 8 . . . Domestic felicity. It is not universal even among the families of the healing art, Dr. Coulter's for example. His injection of mustard gas for a patient with Hodgkin's disease wrought wonders. Fever disappeared, the enlarged spleen and lymph nodes were reduced in size. Diminution in the mediastinal masses was marked, and the dyspnea and dysphagia were gone.

As I passed by his house, he called me to come in. He wished to discuss the case with me. The mailman handed some letters to his beautiful wife, and she was about to open one letter. "I thought," he screamed and forgot my presence, "that you never open my mail." "I never do," she spoke defiantly, "but this one is marked 'private and personal.' " As he attempted to take the letter away from her, she ran into the next room and locked the door. Then I heard her scream.

Confusedly he said, "A man should never marry." No, he shouldn't, if he has an affair, and the erudite doctor, so people say, has one. Deceit, suspicion and the "other woman" are the cataclysmic forces that disrupt, wreck and ruin homes and entire families, mainly the children. Domestic discord is too common in American homes even if there is no competitor.

There I sat at 3:00 A.M. at the bedside of little Patrick, who was cyanosed because of a severe attack of bronchial asthma. The phone rang, and a voice said: "This is Mrs. McCarthy from next door. I see you ain't sleepin' yet. Can I come over for the rollin' pin?" "No," was the answer. "Can't spare it. My brute ain't come home yet." At that moment the door opened and the husband did come. He

smiled sheepishly as he faced his irate wife, then lit a match and stared at the floor. "And what, pray tell me, are you lookin' for," the wife asked, with one hand on the rolling pin. "Looking for an excuse, me darlin'. I have none with me." This disarmed her completely. She embraced and kissed him, then called her neighbor to inform her that she can have the rolling pin now.

* * *

March 12 . . . And here is stammering, impractical, philosophical Dr. Gilliam, who always, when by himself, soliloquizes. He does not stutter when no one is listening. His hatred for his mother-in-law is an obsession with him, while the love of his wife for her mother borders on the abnormal.

Smoothly, he spoke when Dr. Follis and I entered, unknown to him. "Ah, that great discovery of Dr. Bogomolets of Soviet Russia, the prevention of the connective tissue from aging by injection of antirecticular cystoxic serum. Communistic Russia. Like despair vieing with a lusty life. Omnipresent brutality, yet in medicine, one of the great sagas of science in modern times. That discovery will double, possibly triple human lives—ah, that marvelous blending of generations. . . ."

He suddenly looked up to his mother-in-law's framed picture hanging on the wall. "Hell, no, that witch too will live long. No. She already has lived too long. Hmm. Yesterday, she said she'd give half of her life for a pineapple. I told Margaret (the maid) to get two pineapples, and let her give up her whole damn life. . . ."

He suddenly raised his eyes and paled. At the head of the stairway stood the tall, elderly woman, listening to every word. There was a sarcastic, toothless grin playing on her thin lips. She descended the stairway as her eyes spat fire. Then she made two fists and approached him in measured steps. It sounded like the voice of doom tolling off the last minutes. By the time she reached him, he vanished.

Follis and I left, without his knowing we were there. Said Dr. Follis: "I would not sell my mother-in-law for ten thousand dollars." Pause, then, "She is insured for twenty thousand."

* * *

March 15 . . . The past of people and events is overdiluted by Time, but not that of bachelor maiden Carrie Holmes. The deed of yesteryear is growing and is gaining unforced momentum. Middleaged, more 50 than 40, her beauty has not withered a whit. Her medical problem is vesical neck syndrome. Frequency of urination, pain and distress at the end of the act, urgency, tenesmus, strangury and the sensation that the bladder still has to be emptied. The last few days she was suffering from incontinence.

I told her that her case is somewhat unusual, for it is common almost exclusively in married women, who have had one or more pregnancies. She sat as if in a daze and then rose with a start. The lady in question, at the age of 17, young and beautiful, became the secretary of chemist Collies, and until this day was still in his employ. Collies was then young, in the middle thirties, married and childless. The couple adopted a boy who last year graduated from medicine, and today he is to be married. The son is not aware that he was an adopted child. He wanted the marriage to be a private affair, and does not want his father's secretary to be present, for reasons which are known to himself.

"I must confide in you," she spoke tremblingly. "I was pregnant, and did give birth to a child. Yes, a boy. He is to be married today. The father? My boss, Collies. No, his wife does not know that I am the mother. Neither does my son. Collies wants me to leave him and leave town. He says he'll pension me." Silence for a few seconds. Then her voice mounted, as she exclaimed: "My son, his supposed mother, the world, should know it today. I shall not be denied the presence of my child . . ." and out she ran weeping loudly.

The thorny, unsuspected, tragic and painful human problems, unknown and unthought of. What effect will the news have on the young doctor, who loves his supposed mother vehemently? What will Mrs. Collies do when she learns that her husband is the real father of their adopted son?

Spoke colleague Sarton confidentially: "Did you hear my lecture last night on the dynamic unit of mother and child, on the emotional development when the interaction of the two is to be seen in statu nascendi? I don't think my audience knew what I was talking about. Well," he sighed heavily, "neither did I."

* * *

March 25 . . . Chronicle of minor events, and maybe not so minor. It was a long, repetitious explanation I gave to pious Mr. Horringer about the blood of his pregnant wife being Rh negative, and about the Rh antibodies in her blood. Then I told him that the infant will have to be transfused with Rh negative blood if its cells are found to be sensitive to Coomb's test. The last took an hour to elucidate.

Now it was his turn. His face was red, his lips quivered, his fists, both of them, went down on the table with force, the plates shook and one fell off and broke. Looked like he was displeased. Then he sputtered: "So, you are going to change the blood the Lord put in that baby of ours. It is the Lord's will. Understand, or don't you. His will, His. Don't you dare to lift a finger . . ." he couldn't talk any longer.

That was four months ago. The child was born and was transfused, unbeknown to the God-fearing papa. The baby is doing well. "Now," he spoke smilingly, "what did I tell you. Just let Him do as He desires."